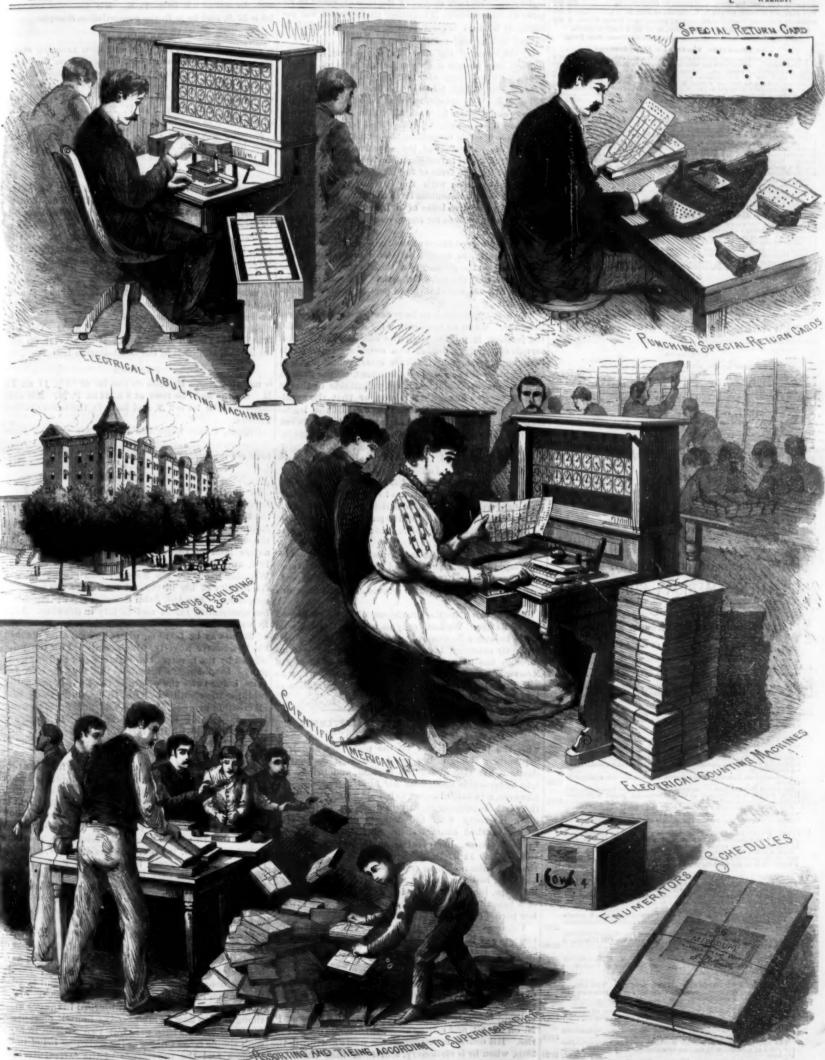


A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. LXIII.-No. 9.

NEW YORK, AUGUST 30, 1890.

[88.00 A YEAR



THE NEW CENSUS OF THE UNITED STATES-THE ELECTRICAL ENUMERATING MECHANISM. [See page 182.]

Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors. PUBLISHED WERKLY AT

No. 361 BROADWAY, NEW YORK.

A. E. BEACH.

132

149 133

TERMS FOR THE SCIENTIFIC AMERICAN.

.....83 00

The Scientific American Supplement

ts a distinct paper from the Scientific American suppressed to the Scientific American Tile Supplements to season the Scientific American Tile Supplement in aims with Scientific American Terms of subscription for Supplements in aims of the Scientific American Scient

Building Edition.

Building Edition.

THE ABCHITECTS AND ECLAPSIE EDITION OF THE SCIENTIFIC AMERICAN is a large and splendid litestrated periodical, issued mouthly, containing floor plans, perspective views, and sheets of constructive details, crisising too plans, perspective views, and sheets of constructive details, crisising to modern crohitecture. Buch number is illustrated with such such as the state of the containing the state of the containing and architectural work in great variety. To builders and all who contemplate building the work is invaluable. Has the largest circulation of any architectural publication in the world.

Whation, \$4.50 a year. To foreign Poetal Union countries, \$5.00 year, combined rate for Buildings Edition, Scientific American, \$5.00 year; combined rate for Buildings Edition, Scientific American, \$5.00 year; combined rate for Buildings Edition, Scientific American, \$5.00 year; combined rate for Buildings Edition, Scientific American, \$5.00 year; combined rate for Buildings Edition, Scientific American, \$5.00 year; combined rate for Buildings Edition, Scientific American, \$5.00 year.

Spanish Edition of the Scientific American.

A SHRIGH SHIFT A LINDERMIAL (Spanish trade edition of the ENVIPTC A RESIGNATION is published monthly, uniform in size and typophy with the SCHENTIFIC AMERICAN. Every number of Le Americal fuely illustrated, it is the tinest scientific, industrial trade naper nade in the Spanish language. It circulates throughout Cube, the West less, Mexico, Central and South America, Spain and Spanish possess—wherever the S-mainsh language is spoken. \$2.00 a year, post paid to part of the world. Single copies 25 cents. See prospectus. MUNN & CO., Publishers,

361 Broadway, New York. The anfest way to remit is by postal order, express money order, praft or bank check. Make all remittances payable to order of MUNN

NEW YORK, SATURDAY, AUGUST 30, 1890.

(filnetrated articles are marked with an asteriak.)

a, with two mouths. Like the core, the August shower of the course counting the core of th ertain pule ring and pin, Weedenfold's 1.0
enfold's 1.0
relines as twiteebarre, 7.1
relines 1.1
relines Protto-etching, morroweast in Photo-prints, machine for make Planeta in September.

Prompelas residence, reproduction of a Railroad tie, Pailows Lairroad trons electrically heated. Ships of war, now American. Ships of war, now American. Truning of stool.

Truning of stool.

Truning of stool.

Truning array, transplanting.

Trees, array, transplanting.

Water, box to destroy, germs in 120 138 141 156 136 136 137 128 336 a Mexican textile ... the transfer of nd."

TABLE OF CONTENTS OF

SCIENTIFIC AMERICAN SUPPLEMENT

No. 765.

For the Week Ending August 30, 1890.

Price 10 cents. For sale by all newsdealers

- BIOLOGY.—A Contribution to the Biology of Diphtheria.—By Dr. E. KLEER.—The contagium of diphtheria, the microbe, and BOTANY.—Manna-Yielding Plants.—By JOHN R. JACKBON.—A yery interesting paper, describing a large variety of plants yield-
- 1V. CHEMISTET.—Alkali Manufacture.—Statistics of the great chemical industry.
 A Mercury Still for the Rapid Distillation of Mercury in a Vacuum.—By Fugiszure J. Sairgs.—A modification in the mer-cury still, by which the process of distillation is greatly accelerated.
 —; illustration. An Analytical Lacon.—The scheme for qualitative analysis in in Amylios services of the ser
- V. CIVII. ENGINERING.—Transmission of Power by Compressed Air.—A very valuable and important review of the present aspects Air — A very valuation and unpressed in the second attempt at the solu-of this engineering problem.

 New Project for a Ship Hailway.— A recent attempt at the solu-tion of the problem of ship overland transportation.—The use of a movable tank for floating the vessel.—Silinstrations.
- VI. BLECTRICITY.—Bestroma FITZGERALD.—An admissible ments based on the famous The Telphor Bailway.—The at the Edinburyh expunition. comens.—I illustration...
- mgst.-Important Hindoo festival.

- 12290

THE NEW PATENT LAW OF MEXICO.

A new law relating to patents has been passed recently by the Mexican congress, and is now in operation. It is, on the whole, of a satisfactory and liberal nature, well calculated to encourage inventors and stimulate the introduction of new industries within our sister republic.

Under the former law the obtaining of a patent in Mexico was a peculiar and somewhat difficult operation. A special act of the Mexican congress was ne sary for each patent, a government official fixed the fees, which varied according to the supposed importance or value of the invention, the member of the legislature who took charge of the case expected to receive an honorarium. Altogether the inventor was pecuniarily bled at several points, and was obliged to submit to long and tedious delays.

By the terms of the new law any person, native or foreign, may obtain a patent for the term of twenty years, with privilege of extension for five additional years. The official fees for the first term vary from \$50 to \$150. The invention must be worked, or all neessary steps taken to work it, within five years from the date of the patent. No official examination or guarantee is made respecting the novelty of the invention or the sufficiency of the specifications. Patents will be granted for inventions already patented in other countries, but the term of the Mexican patent will expire in such cases with the expiration of the first foreign patent. Patentees have the exclusive right for one year after the issue of a patent to file supplementary applications for improvements on the original patent.

The government reserves the right, on payment of a fair indemnity, to appropriate any invention for the public use, on the ground of national expediency or for the reason that the patented article is of such a nature that its free use would be an important source of publie wealth.

The first applicant is to be presumed to be the first inventor. When an application for a patent is made, the petition is published in the official gazette at intervals of ten days during two months. During this period any person may institute interference proceed ings to prevent the grant of the patent, on the ground that the invention claimed is not patentable or that it is the invention of another person, or that the applicant is not the original inventor or not the legitimate assignee of the original inventor. As between two persons claiming the same invention, the first inventor shall be entitled to the patent; if the priority cannot be determined, the patent shall be granted to the first applicant. Judicial authority shall review the evidence and adjudicate the matter.

All patents and drawings are to be published yearly by the government. Patented articles are to be stamped with the date and number of the patent. Patents may be assigned, and the transfers recorded in the Department of Public Works.

The President is authorized to issue rules of practice with regard to the new law, and also to establish a special office for patents in connection with the Department of Public Works. All previous patent laws are

Such, in brief, are the provisions of the new patent law of Mexico. We have only to add that those who desire to secure Mexican p tents may have the business promptly attended to on the most reasonable terms through the SCIENTIFIC AMERICAN patent agency of will furnish to applicants such other information as may be desired.

POSITION OF THE PLANETS IN SEPTEMBER.

VENUS

wins the place of honor on the planetary annals of September, though her great southern declination shortens her stay above the Borizon, and brings her into unfavorable conditions for observation. She is, however, a beautiful object to behold as she approaches the earth, increasing rapidly in diameter, and glowing more intensely with the delicacy of coloring that is her marked characteristic. She reaches an epoch in her course, her greatest eastern elongation, on the 23d, at 11 b. P. M., when she is 46° 34' east of the sun. She no longer travels eastward from the sun, but, as if bound to him by an invisible her steps, increasing her speed, and taking on the form of a beautiful crescent, as she makes her way toward her period of greatest brilliancy.

Venus sets on the 1st at 8 h. 2 m. P. M. On the 30th, she sets at 7 h. 15 m. P. M. Her diameter on the 1st is 20'.2, and she is in the constellation Virgo.

JUPITER

is evening star. He is superb as he pursues his course over his celestial path, in spite of his southern declination, becoming visible in the southeast before the twilight fades, reaching the meridian at 9 h. 40 m. P. M. on the 1st, and setting about three hours before sunrise. His course is retrograde or westward until the 28th, when he is stationary, and after that time it is direct or eastward until the end of the year.

Jupiter sets on the 1st at 2 h. 20 m. A. M. On the 30th, he sets at 0 h. 20 m. A. M. His diameter on the 1st is 44'.6, and he is in the constellation Capricornus.

MARS

is evening star. He is in quadrature with the sun on the 21st, at 4 h. P. M., being then 90° east of the sun. He travels eastward during the month, and passes beyond the bounds of Scorpio into Sagittarius, his approach to Jupiter being easily perceptible. His decrease in ruddy luster is noticeable, and his diameter has decreased nearly one-half since his opposition in May.

Mars sets on the 1st at 10 h. 37 m. P. M. On the 30th, he sets at 9 h. 58 m. P. M. His diameter on the 1st is 12°.0, and he is in the constellation Scorpio.

MERCURY

is evening star until the 29th, and then morning star. He reaches his greatest eastern elongation on the 8d at 4 h. A. M. He is at that time 27° 5' east of the sun and may be picked up by sharp-eyed observers in the western twilight. He reaches inferior conjunction with the sun on the 29th at 2 h. 3 m. P. M., and completes his swift course as evening star.

Mercury sets on the 1st at 7 h, 16 m. P. M. On the 30th, he rises at 5 h. 30 m. A. M. His diameter on the 1st is 6'.8, and he is in the constellation Virgo.

is evening star. He is in conjunction with Venus on the 2d at 4 h. A. M., being 2° 6' north. The planets will be near each other on the evening of the 1st, and be interesting telescopic objects.

Uranus sets on the 1st at 8 h. 11 m. P. M. On the 30th, he sets at 6 h. 22 m. P. M. His diameter on the 1st is 3'.5, and he is in the constellation Virgo.

SATURN

is morning star. He rises on the last of the month more than two hours before the sun, and will soon be easily visible in the morning sky.

Saturn rises on the 1st at 5 h. 4 m. A. M. On the 30th, he rises at 3 h. 37 m. A. M. His diameter on the 1st is 15'.2, and he is in the constellation Leo.

is morning star. He rises on the 1st at 10 h. 17 m. P. M. On the 30th, he rises at 8 h. 24 m. P. M. His diameter on the 1st is 2'.6, and he is in the constellation Taurus.

Uranus, Venus, Mars, and Jupiter are evening stars at the close of the month, Mercury, Saturn, and Neptune are morning stars.

JOHN ERICSSON.

In another column will be found an account of the imposing ceremonial which took place in this city on the 28d inst., on the occasion of the transfer of the remains of this distinguished man from the cemetery to the war ship Baltimore, for removal to Sweden, the native land of the deceased. He was born July 31, 1808, and died March 8, 1889, aged almost 86 years. Wermland, among the Swedish iron mountains, was the locality of his birth, and his father was a mining proprietor. As a lad, John Eriesson was distinguished for mechanical talent and facility in drawing. At 17 he was a lieutenant in the Swedish army. At the age of 23 he was in London, where he soon after planned the locomotive Novelty, which competed for the prize offered by the Liverpool and Manchester Railway Com-Messrs. Munn & Co., 361 Broadway, New York, who pany. Stephenson's machine, the Rocket, took the prize, being twice the weight of the Novelty and better fulfilling the conditions. But the Novelty could beat all creation in speed, as she made fifty miles an hour, though weighing less than four tons. Ericsson was thus identified with the birth of the locomotive, and he astonished the world with the marvelous velocity of his machine.

> Soon after this Eriesson produced plans for screw propellers for vessels and demonstrated their practicability in the form of a small tug on the Thames, by which great ships were easily towed, to the wonderment of all beholders. The British Admiralty refused to allow the Eriesson screw to be put in any war vessel, being fearful that ships could not be steered if such a thing were in the stern. Some Americans, however, gave him encouragement to come to the United States, which he did in 1839, and here, in conjunction with Robert F. Stockton, he designed the screw and machinery for the war ship Princeton, in which for the first time all the mechanism for propulsion was arranged below the

di di eta Ha

Br

eri

pre

Pr

exp

one

var

to 1

cap

Ven

care

25 o desi

lam

Wat

In a recent number of the Army and Navy Journal, Mr. William C. Church, the appointed biographer of the late Captain Ericsson, speaks of him and some of his achievements and their results as follows:

"We honor ourselves in offering some small meed of recognition to the man who has done so much for the world; whose whole soul was absorbed in the one great thought as to how he might make himself most useful to his fellows. There were but two articles in Ericsson's simple creed: one was the unfailing belief in the wisdom and the providence of the 'Great Mechanician,' as he called Him whose laws of motion and of

force it was his mission to study and apply; the other, that the Creator had bestowed upon him unusual capacity for this particular work, and that it was his duty to exert his powers to the very utmost to accomplish all he could within the span of his life.

It is susceptible of the clearest demonstration that our great navies of to-day, mercantile and national. are the result of ideas that Ericsson introduced into navigation half a century or more ago-introduced in the face of opposition and ridicule so universal and uncompromising that the wonder is that even his sturdy strength was sufficient to overcome them. As he has himself said, the opposition he encountered, simply because he knew more than others on the subject under discussion, brought many hours of unhappiness to a life otherwise prosperous and contented.

What he has done for the country is only partially known, and the appreciation of it will grow with time. Nothing is more utterly absurd, to one who knows the facts, than the charge of plagiarism brought against him in connection with the Monitor. His studies and his experiences for nearly forty years led progressively up to the result at Hampton Roads, and what has followed it. Consider, first, his youthful inquiries into the principles of stability in floating structures, prompted by observing the movements of rafts upon the Swedish lakes; next his application in 1828 to Sir John Ross's Arctic steamer Victory of the principle of under-water propulsion; then his application of vertical engines to

the screw in 1887, and the combination of the two principles, with coal armor and other features added, in the Princeton of 1843; finally his studies in 1846, in answer to a call from Congress, into the subject of making iron war ships shot proof, and his positive conclusion that this was impossible in the case of an ordinary naval vessel.

The Monitor grew as naturally out of these and kindred studies, and the conclusions of a lifetime, as the fruit out of the flower. Ericsson was no more indebted to Quimby, et id genus omne, for the Monitor than were Grant, Sherman, and Sheridan for their success upon the battlefields of the rebellion to the gentlemen who so ably discussed military matters about that time in the journals of the day.

"That we owe the screw propeller and the great commercial and naval changes that follow it to John Ericsson is beyond question. John Bourne, whose investiga tions have taken shape in a bulky volume, describing over one hundred attempts at a screw, gives the credit for its first practical application to John Eriesson. Not only did he make it a success, but he successfuly applied it to sixty different vessels navigating the waters before any other screw went beyond the stage of experiment. He built the first screw naval vessel, the U.S. ss. Princeton. He designed, in New York, the engines of the first successful British screw vessel, the Amphion, and through his agent, Von Rosen, he introduced the screw into the French navy. Not only does Bourne give to Ericsson the honor of the screw, but so does Bennett Woodcroft, of the British patent office, himself the designer of a screw, and author of a work upon the history of the

propeller, and Scott Russell, also. The tary of Encyclopædia Britannica' truthfully declares that grouped themselves with bared heads around the bier the government. while others made various tentative efforts after the screw, a small vessel fitted with a propeller, patented by Ericsson, was the first brought into practical use. Those who deny these claims speak from ignorance or prejudice, and not from knowledge.

Even in ordnance Ericsson was a master, and in sworn testimony before the congressional committee on the conduct of the war both Parrott and Dahlgren distinctly declared that they dated their successful studies in ordnance from John Ericsson's Princeton. He brought with him from England in 1839 a reinforced 12 in. gun, which is now, in 1890, in good shape at the Brooklyn Navy Yard, after being subjected to the most crucial tests with heavy charges. He anticipated the present idea of determining distances at sea with an as perfectly practicable. It was introduced into the Princeton, and was awarded a prize at the London exposition of 1851, after a trial of eight years.

"The compressor gear for handling heavy guns, and one contrivance after another, introduced into the various vessels, we owe to his genius. When we come to minor details the list is endless. He had enormous capacity, endless industry, unbounded fertility of invention, and his life was prolonged through a working career extending over full seventy years."

STENCIL INK.—Use shellac 2 oz., borax 2 oz., water 25 oz., gum arabic 2 oz. Color with fine lampblack, to desired consistency. You may use turpentine and lampblack with a little linseed oil, or even glue and water with lampblack.

Removal of Ericsson's Remains to Sweden.

On the 23d inst, the city of New York was the scene of a most imposing and remarkable ceremonial, the occasion being the removal from the city cemetery to the transporting war ship of the earthly remains of John Ericsson, the distinguished inventor and engineer. The people of his native country with one voice entreated that his ashes might be allowed to repose with those of his ancestors in the soil of Sweden, his beloved native land. His American executors could not refuse compliance with the request of the Swedish nation, and the government of the United States, in token of the profound reverence in which his memory is held by the American people, selected its largest and finest available ship of war-the Baltimore-to convey the emains of the honored dead to the Swedish shores

The exercises attending the transfer of the body from the city cemetery to the man-of-war in the harbor were attended with all the pomp and circumstance of great public demonstration. The body had been embalmed, and on its removal from the receiving vault was found to be in a perfect state of preservation, the features like those of life. The coffin was then placed in a zinc box, hermetically sealed, and this again was placed in a large box of polished oak, which was then draped with the national colors of Sweden and the original American flag that floated over the Monitor in its fight with the Merrimac in 1862.

The Scandinavian singing societies of New York now



CAPTAIN JOHN ERICSSON.

and sang Otto Lindsblad's "Stridsbaen," or the war prayer of Sweden. Then sailors of the American navy bore the remains to a hearse drawn by four black horses, covered with heavy black funereal trappings, the bells of the neighboring churches began to toll, the drums rolled, the military fell into line, and at one o'clock p. m. the great procession, consisting of citizens, societies, and officials, including the Secretary of the Navy, Rear Admiral Worden, the first commander of the Monitor, Major-General Howard, of the army, the Mayor of New York City, and many others, began to move to the funeral dirges of many bands. Among the societies that assembled to do homage to the distinguished dead were the Amaranthus and Manhem Lodges of Odd Fellows; the American Society of automatically registering distance instrument, which Swedish Engineers; the American Society of Civil Engineers; the American Society of Mechanical Engineers; the Marine Society of the City of New York; greatest discoveries of the last half century." The the Swedish division; the Norwegian-American Seamen's Association ; the Farragut Naval Veterans' Association, G. A. R.; Naval Post, No. 516, G. A. R.; Stevens Naval Post, of Hoboken, G. A. R.; Rankin Post, No. 10, G. A. R.; William Lloyd Garrison Post, No. 207, G. A. R.; workmen of the Delamater Iron Works; the Osbon Cadets; several lodges of Odd Fellows.

The route of the procession was down the great thoroughfare of Broadway to the Battery, at the extreme southern end of the city. The buildings along the route of the procession were appropriately draped, and the windows, doorsteps, house tops and pavements were thronged with spectators. Flags were at half mast on public and private buildings, and the Swed- N. Y. Med. Jour.

ish colors of blue and orange were everywhere displayed. It was a solemn and impressive spectacle, The number of persons in line is estimated at over 6,000. The Swedish division, composed of members of various societies, formed an important portion.

When the procession reached the Battery, the waters of the bay were covered with steamers crowded with people. A fleet of national war ships lay extended in a long line, which reached from Bedlow's Island almost to Robins Reef. The flags of three admirals flew from three different flagships anchored in the line. First came the Dolphin flying the blue flag of Admiral Gherardi. The Petrel and Kearsarge were next in line. Then came the Pensacola with the red flag of Admiral McCann flying, and after the Enterprise. The Atlanta and Yorktown were next, and then the Chicago with the flag of Admiral Walker.

Just above Bedlow's Island was anchored the Baltimore, above her the Despatch, and still further upstream was the monitor Nantucket, one of the original monitors, which did service in the war. Here and there graceful steam yachts were moving about, and off Pier A lay a flotilla of more than thirty pulling boats and steam launches from the men-of-war. Everywhere on land and sea, on houses, forts and fleet, flags were at half mast.

The coffin was carried on board the Nina, the band playing the Swedish naitonal anthem, when, with minute guns sounding from the monitor Nantucket,

> with two long lines of pulling boats and steam launches on either side, and attended by a great fleet of steamers bearing thousands of spectators, the body of the lamented Ericsson was borne to the side of the Baltimore, raised upon her yard arms, and deposited on her deck. Mr. C. H. Robinson, one of the executors of the Ericsson estate, in a few appropriate words, committed the remains to the care of Capt. Schley, of the Baltimore, to which the captain replied, accepting the solemn duty.

> A little time elapsed and then the white and blue royal naval ensign of Norway and Sweden was run up to the fore of the Baltimore, and she steamed slowly down the line of war vessels and began her voyage to Sweden. As soon as she got under way the guns of Castle William began a national salute, and as she passed down the line of war vessels, each hoisted the naval ensign of Sweden and Norway at the fore and saluted with twenty-one guns. Fort Hamilton and Fort Wadsworth, at the Narrows, also saluted the Baltimore as she passed out to the open sea.

THE PHOTOGRAPHERS' CONVENTION-A MEMORIAL TO DAGUERRE.

The eleventh annual convention of the Photographer's Association of America was held between August 12 and 15, in the National Museum, connected with the Smithsonian Institution, at Washington, D. C., and terminated its session by presenting to the United States a memorial to Daguerre, the discoverer of photography, which has been placed in the center hall or rotunda of the large building. It was unveiled on the 15th inst., by Mr. J. W. Noble, the Secretary of the Interior, who accepted it for

The memorial was designed by the sculptor, Mr. J. Schuyler Hartley, of New York. It consists of a massive granite base, supporting a granite globe, the whole standing sixteen feet high. The design in bronze represents a figure, "Fame," with partial bended knee in a reverential posture, placing the bronze medallion bust of Daguerre, as if it were a picture encircled with a wreath of laurel, at the foot of the globe; the ends of the wreath are carried over the globe and hang gracefully down on one side.

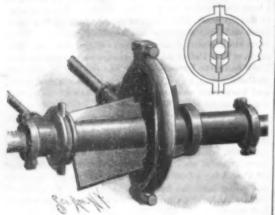
The design is intended to show how universal Daguerre's discovery has become. The bronze figure is 8 ft. 4 in. high, and the medallion bust of Daguerre is one and a half times life size. The bust was modeled from a daguerreotype of Daguerre himself.

On the base of the pedestal are inscribed the words Photography, steam, and ele ctricity, cost of the memorial is \$6,000.

PRESERVALINE is the name of a preparation sold to milk dealers to enable them, by adding it to their milk, to paim off stale milk on the community. It is supposed to consist mainly of boric or of salicylic acid. Ten per cent of the milk furnished to Brooklyn is said to have had this substance added to it. The persons concerned profess that the milk is not made injurious by this procedure, but it is very obvious that it may become injurious under certain circumstances, and the State Dairy Commission is quite right in declining to leave that question to the milkmen's discretion .-

AN IMPROVED SHIFTING ECCENTRIC.

The illustration represents a device adapted for cutting off at any desired point, or for stopping and reversing the motion of the machine whenever desired. It consists of a disk held to slide across the main shaft, with inclines mounted to slide and pass centrally through the disk, the inclines turning with the main



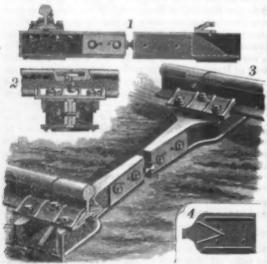
BRANCH'S CHIFTING ECCENTRIC.

shaft. A sleeve, preferably made in two parts, is secured by end clamps on the main shaft, and a portion of the central part of this sleeve has flat sides, as shown in the sectional view, on which fits a disk having an elongated opening with curved ends, so that when the sleeve is turned the disk is turned also, while at the same time free to slide across the sleeve. On the disk is held, in the usual way, an eccentric strap connected with the slide valve of the machine. In the two sections of the sleeve are opposite longitudinal grooves in which slide inclines, secured at one end to a collar sliding on the sleeve, and at their other ends to a flanged collar connected with a shifting lever, whereby the inelines may be moved backward and forward in the opposite grooves of the sleeve. The inclines also fit into opposite recesses in the disk, in the top and bottom of the elongated opening. When the eccentric is in the position shown in the sectional view, no eccentric motion takes place, and the valve is at a standstill; but by shifting the flanged collar to one side, the inclines cause the disk to slide into an eccentric position relative to the main shaft, so that a backward and forward motion is imparted to the valve, the extent of which can be so regulated that the steam or other motive will be cut off at any desired point.

For further information relative to this invention address Mrs. Emma L. Branch (administratrix of Jesse M. Branch, the inventor, deceased), Lawrence, Mich.

AN IMPROVED RAILROAD TIE.

The illustration represents a strong and durable tie, with means for attaching the rails thereto, which has been patented by Mr. John M. Fellows, of Burlington, Ind. Fig. 1 shows a longitudinal view, and Fig. 2 a cross section of the tie with rail attached, the latter view being partly broken away, Fig. 4 being a bottom view of one end of the tie, showing its strengthening ribs, while Fig. 8 lliustrates the entire device in perspective. The tie may be of wood or metal, preferably of the latter, and has two similar end portions with inwardly extending shanks, united near the center by a spring, to permit of the tie bending without breaking. The ends of the tie are widened or forked, and have



flanges on their upper portion on which rest the chairs, the flanges having holes by means of which the chairs are bolted and pinned thereto. The chairs also have suitable holes for these bolts, and depending pins to fit in corresponding holes in the flanges, to assist in holding the chairs in position, the rails resting and \$9,680,942,240, on which last year's gross earnings were

adapted to fit the flanges of the rails. The abutting ends of the rails have each a longitudinal recess in which fits a dowel pin, so that the ends of the rails will always be in line; and in the rear of the dowel pin, in a recess of one of the rails, is a spiral spring pressing the end of the pin, permitting the rail to contract or It has been patented by Elvin L. Smith, of Mansfield, expand under the influence of heat or cold. The dowel pin has a removable arm extending through a slot to the outside of the rail, by means of which the pin may be drawn back into the rail when a joint is to be made. The boits used are peculiar in that they have a ratchet wheel just below the head, and when turned to position are held by a pawl attached to the part to which the bolt is applied adjacent to the bolt.

Grouping Trees.

It is one thing to plant, and almost any one may in ome way accomplish the task; but it is another thing to plant effectively, for it needs a true artist to do this successfully. A wide range of acquaintance with the aspects, habits, and dimensions of plants, their development of special features, times of flowering, alternation of tint, the positions best suited to bring out their beauties or to be beautified by them, are all matters of importance, and calculated to tax the skill and taste of the most experienced and accomplished. Grouping is a department of ornamental planting at once the most effective and the most difficult. There is a wide difference between a group and a clump. A clump is usually a mass of planting, formal and monotonous in aspect; whereas a group should present an infinite variety of form and outline, all the material of which it is composed retaining a certain amount of individuality, and yet blending in happy and graceful unison, free from trim formality, as also from absurd incongruity; and he who would accomplish the art of thus planting cannot do better than become an earnest student of nature herself.

As a rule, groups should be bold and dense; any thing like thinness has a mean and poverty-stricken aspect, which should be carefully avoided. The outlines of groups, both on the ground and against the sky, should be carefully designed; the ground lines should be easy and flowing, free from false curves and anything approaching to rigidity; the sky line widely diversified, but ever harmonious-here rendered striking by the upshooting of some plant of distinct character, anon merging easily and naturally into lines of smoothness, graceful as those of nature herself. Thus will be secured those exquisite effects of light and shade so full of charm and beauty to the eye capable of their appreciation. These features are of the greatest importance in the immediate vicinity of water, where shadows and reflections are ever changing and ever new. Again, park and other like groups should always be accompanied by a few irregularly planted trees, such as thorns, etc., especially at their salient points; this happily removes all stiffness, and gives a natural expression to the whole. The composition of groups should always be ruled by the position they occupy. On the lawn the plants employed should be rich and elegant; in the park or on the hillside, noble and majestic; near water, partially pendulous; and not only so, but the general aspect of the locality and the style of house should also be taken into account, as certain trees are more in unison with wild, and others with sylvan scenery. It is also usually laid down as a rule that pyramidal forms harmonize best with Grecian and round-headed forms best with Gothic styles of architecture. This rule, however, must be understood as of general rather than minute application, or a most unnatural and monotonous effect will be the result. Groups may be composed of one or more species or varieties, and if carefully executed, with equally good results. As a rule, the plants should differ in size, in order that the outline may be more varied; if the group be of irregular form, the largest plants should be placed in its center and salient curves; it will thus gain in dignity, and be far more natural and pleasing than if faced by a stiff gradation. Mixed groups should be composed of such trees as harmonize or contrast well with each other.-The Garden.

161,397 Miles of Railway.

Poor's Manual says at the close of 1889 there were, in this country, 161,397 miles of track, of which 5,751 were laid during the year. The gross earnings for the year were a trifle over one billion dollars, and the net earnings nearly one-third of a billion—\$318,125,339.

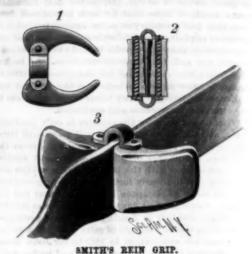
It costs, on an average, 2:17 cents to carry a passen ger one mile in the United States, and the average length of his trip is 24'17 miles. About half a billion passengers were carried.

Over 600,000,000 tons of freight were handled during the year. The cost of moving one ton one mile, on the average, has been brought down to 0.9734 cent, while for some of the great trunk lines the rate is much

The total investment, measured by share capital, funded and unfunded debts, in American railways is signed to be passed through a fabric to be suspended, being firmly held in a longitudinal recess of the chair 10.4 per cent, and net earnings 8.3 per cent.

AN IMPROVED REIN GRIP.

The accompanying illustration represents a small, neat device, to be located on the driving reins or a riding bridle, to afford an adjustable abutment whereby a firm grip upon the reins may be assured at all times.



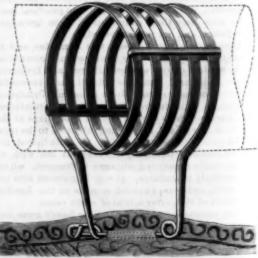
Mass. The device consists of two similarly shaped cam blocks with curved wings, held oppositely by bracket plates, as shown in Figs. 1 and 3. The plates are held spaced apart by parallel rods whose ends are secured in the flanges of the bracket plates, and upon these rods the cam blocks are mounted, a spiral spring being introduced around the rods, as shown in Fig. 2. One end of each spring is fastened to the flange of the bracket plate, and the other end is interlocked with the cam block, in such a manner that their strength will be exerted to extend the wings oppositely, and cause the cams to bind upon a rein passed be-tween them. When in use, the fingers abut against the lateral wings, giving a firm hold, but by a slight pressure upon the free ends of the wings they may be instantly folded into the position shown in Fig. 1, when the grip is released from the rein. The grip may be made to embrace two lines as well as one, or a grip may be applied to each rein where a team hard to control is to be driven.

A Large Tree.

The Victoria Colonist says: "Among a boom of logs at Leamy & Kyle's mill, on False Creek, Vancouver, is a tree cut into four 24 foot logs taken from one tree, which is one of the largest specimens of the Douglas fir that has ever been cut in this province, whose record for giants of the forest is world-wide. These four logs were respectively 84 inches, 76 inches, 70 inches, and 60 inches, and in none of them was there a knot or other defect. The total number of feet of lumber that can be cut out of this tree is 28,614."

AN IMPROVED CURTAIN-POLE RING AND PIN.

An improvement in rings and pins for suspending curtains, portieres, lambrequins, and other draperies from horizontal poles, is shown in the illustration, and has been patented by Mr. Leopold Weidenfeld, of Broken Bow, Neb. The part which encircles the pole is made of spring metal in the form of a helix, the two end portions thereof projecting downwardly. One of these ends is turned up to form a clasp, and the lower part of the other end is bent to form a coil to give sufficient spring to the end, which is formed into a pin



WEIDENFELD'S CURTAIN-POLE RING AND PIN.

adapted to be retained by the clasp. The helical portion of the device is clasped by one or two flattened rings or bands, to prevent it from spreading and allow the pin to be released from the clasp. The pin is deas shown in the illustration, and is long enough to take firm Loid thereof, so that it will not be easily torn away.

Transplanting Large Trees.

The superintendent of a cemetery in Chicago gives an account. in Garden and Forest, of the removal of two trees, one of which was sixty feet high and more than two feet in diameter. They were removed in an upright position on rollers, with the aid of a heavy framework of timber. A part of the earth was retained on the roots. The cost was between five and six hundred dollars. It is pronounced too early yet to speak with confidence of the result. There is no probability, however, that the original vigor of the trees will be imparted to these monsters after removal. A tree sixty feet high has a circle of roots at least one hundred and twenty feet in diameter, and an old tree will not easily recover from the loss of most of them, as in a younger tree. We noticed this mode, or a similar one, in use at Chicago, in a former volume of the Country Gentleman.

The practice of removing very large trees has never been successful. In the experiments made many years ago on a liberal scale in the moist climate of Scotland, although the large trees survived the operation, they never recovered their luxuriance, but remained feeble and sickly. We have seen trees removed when eight inches in diameter without ever recovering from the operation. But much depends on preparing them beforehand by shortening the roots, and there would of course be much difference between giving a copious supply of carefully taken up roots, or only a scant quantity of badly mutilated ones.

As a general rule and for common planting, it is not advisable to attempt the removal of trees over an inch and a half in diameter. But with a previous preparation by one or more transplantings, it will not be difficult to remove those which are three inches. Occasionally it becomes desirable to secure by transplanting those which may be four or five inches. Evergreens especially may be required to be transplanted to new grounds. The practice of attempting the work on very large trees, or two feet or more in diameter, as in the Chicago experiment, is not to be recommended in any case. The same outlay of five hundred dollars under the direction of skill, with smaller trees, would accomplish many times more in landscape effect and in sylvan ornament.-Country Gentleman.

AN IMPROVED FOLDING UMBRELLA.

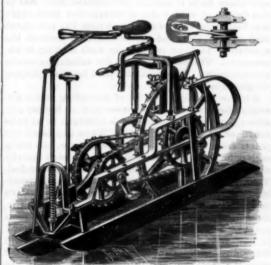
The accompanying illustration represents an umbrella which can be readily folded up when not in use (as shown in Figs. 1 and 3) for conveniently carrying it in a pocket, valise, or other suitable receptacle. The cane of the umbrella is made in three telescoping sections, of which the lower or handle section serves to push the upper section out of the middle section, suitable catches being provided for holding the several sections in an extended position when the umbrella is used, as illustrated in Fig. 2. On the upper or outermost section is secured the crown piece, to which are pivoted the ribs, each made in two parts connected with each other by a joint plate, shown in detail in Fig. 4, so that one rib part can fold on to the other, as shown in Fig. 1, thereby permitting a close folding of

the upper end of the middle section. The joint plates of the ribs are so constructed that when the umbrella is opened the rib parts are prevented from bending outward, and an accidental closing or folding of the rib parts cannot take place. At or near the joints of the ribs, at the inside of the covering material, is arranged a flexible cord or braid connecting the several ribs with each other and serving to prevent the covering material from becoming entangled in the joints of the ribs when the umbrella is closed. The umbrella can be readily extended by the operator pulling out the handle section of the cane to engage with its upper end the spring catch (shown in Fig. 5) of the uppermost cane section; by then pushing the handle section inward the upper cane section is pushed out of the middle section, which latter is held with the left hand of the operator, the right hand being used to manipulate the several parts. A spring catch locks the outermost cane section, when extended, to the middle cane section. The handle section is oved outward until it automatic ally locks itself to the middle section by a spring catch, shown in Fig. 2. At the time the outermost cane section slides outward the braces swing upward and outward, thus moving the ribs and the covering material into their proper

plished by unlocking the spring catches and telescoping the cane sections, whereby the braces and ribs, with the covering material, fold up into the position shown in Fig. 1. The folded umbrella takes up very little room, and may be placed in an additional casing of a suitable fabric, as illustrated in Fig. 3. This invention has been patented and is manufactured by Mr. John Bergesen, 250 Wyckoff Street, Brooklyn, N. Y.

AN IMPROVED SLED PROPELLER.

A device to facilitate the propulsion of a sled over ce or hard snow, and by which different rates of speed may be maintained, is illustrated herewith, and has been patented by Mr. John Stanford, of Chester, Lunenburg County, Nova Scotia, Canada. The main runners are held spaced apart by front and rear yoke frames, the latter frame having an upwardly extending contracted portion over the propelling wheel, which is centrally mounted between the runners upon a short transverse shaft, the wheel having suitable teeth or spikes in its periphery to insure a strong hold on the ice or snow. The bearings of the propelling wheel shaft are in the lower portion of rearwardly and



STANFORD'S SLED PROPELLER.

upwardly curved spring bars, the upper terminals of which are held on standing screw-threaded bolts extending upward from side bars of the frame, whereby, by means of winged nuts, a regulated pressure may be held upon the spring bar ends to cause the propelling wheel to bite more or less upon the ice. Directly forward of the standing bolts is mounted an arched seat support, the uprights of which are adjustable for height, the base plate for the seat spring receiving a rider's saddle, and being bent downwardly in front to provide a depending notched locking bar. To the rear surface of the seat standard is secured a bifurcated bracket arm in which is pivoted a lever having a rearward connection with a pendent link loop, the outwardly inclined limbs of which at their lower ends have a hooked engagement with the spring bars near the journal supports of the propelling wheel, while the forward end of the lever terminates in a handle within easy reach of the rider. By depressing this lever, and interlocking it with one of the notches of the locking bar, the spring bars and the propelling wheel will be raised, and the wheel may thus be removed from contact with the ice or road bed. On the treadle shaft, which is located at a convenient distance in advance of the prothe umbrella. The ribs are pivotally connected by pelling wheel, are two sprocket wheels of different sizes, braces with a brace piece, which is fastened on or near connected by proper chains with wheels on the shaft of



BERGESEN'S FOLDING UMBRELLA.

out any acceleration of treadle movement, and a clutch and clutch-shifting mechanism are provided whereby such changes of speed may be readily effected. The steering mechanism consists of a forward intermediate runner secured to a vertical steering rod, bent rearwardly and terminating in a handle within easy reach steering runner in yielding contact with the road bed. between white and straw color.

To check the speed of the sled a brake is provided consisting of a loop-shaped bar, pivoted to the steering runner, and its limbs loosely embracing the sides thereof, while its forward ends are engaged by an upright rod extending to one arm of a bell crank, the other arm of which is pivoted to a horizontal connecting bar, loosely secured at its opposite end to a brake lever hinge-jointed by one end to the handle bar of the steering rod. A movement of the free end of this lever toward the handle bar depresses the pointed ends of the brake bar limbs and causes them to engage the road bed to impede the forward motion of the sled.

A Cyclone at Wilkesbarre, Pa.

On the afternoon of the 19th of August this thriving city was visited by a whirlwind, which resulted in sad loss of life and destruction of valuable property.

One of the most painful scenes was at the Hazard wire rope works. The cyclone struck the rear of the large brick building. About two hundred men are employed in the works. The roof and side walls were crushed in. The bricks and ponderous machinery were scattered all over. When the storm was imminent the men rushed for the door, but many of them were caught in the ruins. As soon as the calm succeeded the cyclone, men rushed into the ruins and rescued the injured. One by one they were dragged out from under the debris. The number seriously injured at these works exceeds twelve, and there were two killed.

St. Mary's Catholic Church, in South Washington Street, is a total wreck, as is also St. Mary's parochial school, brick, on Canal Street, opposite the church. Father McAndrew's parochial residence was considerably damaged. The solid tin roof on St. Mary's convent, on South Washington Street, was torn off and blown into the street, and a part of the brick wall taken

A car on South Washington Street was overtaken by the cyclone near the Catholic church. In the midst of the terror a large tree fell on the roof, and the passengers gave themselves up for lost.

The Barber Asphalt Company works are blown down. S. L. Brown & Co.'s mammoth business block on Market Street, containing ten wholesale stores, is among the ruins. The Murray coal breaker was partly destroyed, with heavy loss. The mammoth Hollenback breaker is a complete wreck. The fans were stopped while twenty-seven men were at work in the Hillman vein, but luckily they were able to start them immediately. It was a very narrow escape.

The number of the dead is about thirty. A careful estimate places the number of buildings demolished and partly destroyed at nearly four hundred, and some estimate that it will exceed this figure. The loss will probably reach nearly if not quite \$1,000,000.

Corrosion of Zine in Contact with Brick.

A German paper mentions the fact that, under some conditions, sheet zine, when in direct contact with brickwork, suffers to an appreciable extent from rapid corrosion. In building the Berlin city market halls, a portion of the zine work which rested upon brick walls was found to be deeply pitted at a number of places, particularly where the metal was close to the bricks.

Chemical examination of these resulted in showing that they contained as high as 1:14 per cent of soluble salts, of which the destructive effect increases by moisture. The proportion of such salts varies with different kinds of brick, while in some there may be nothing to induce any such corrosion. As a preventive, roofing felt or similar material may be placed between the zinc and brickwork.

Guimbobo.

The Belgian legation at Mexico has recently reported to the Belgian government on the subject of quimbobo, known also as angu, which is found in the State of Vera Cruz, a plant which should be included in the category of all the varieties of Mexican textiles. The guimbobo or angu produces not only a fiber of very superior quality, but can be easily and cheaply cultivated: moreover, the fruit of the plant constitutes a nutritious food. It appears from experiments that have already been made that the quimbobo differs essentially from the ramie cotton, and hemp, as in the guimbobo the covering of the plant surrounds the fiber, and is not mixed up and interlaced with it; this constitutes a decided economy, added to great facility in extraction and utilization. The

places. The folding of the umbrella is readily accom- the propelling wheel, to afford a change of speed with- structure of the plant permits of the operations of separating and removing the bark being performed by machinery, while in the other fibrous plants these operations are difficult, at the same time very costly, and only possible in countries where there is a large number of hands available and cheap. The fiber of the guimbobo has a luster similar to that of silk, and of the rider, a spiral spring on the rod holding the is undoubtedly finer and stronger, with a creamy color

THE CENSUS OF THE UNITED STATES.

The census bureau of the United States for taking the general census is now busily engaged in reducing the schedules furnished by the fifty thousand enume- ture. While it is perfectly obvious that 240 such aperrators, and in tabulating the results of the work done at the beginning of the present summer. The scope of that this never could be required. Thus a person would the original census of former times has been amplified so as to include many particulars, and the work of recording the results is correspondingly increased. Calculating and tabulating machinery has been brought into use to shorten the time expended in reaching the conclusion. With this aid the work is progressing with exceeding rapidity. In the mere summation of results or enumeration in gross a single operator can dispose of 50,000 names in a day. Were this all that is required, the work would be completed this degree of skill is not to be expected from every now. But each schedule contains many particulars, as regards country of birth, age, health data, etc. Each of these headings again subdivides into a large number. Thus, under country of birth all the countries of the world are included, and under health there is a numerons list of diseases to be tabulated. This has led to a division of the office work as regard such particulars, and special tabulations are made for a number of

Our readers are necessarily familiar with the work of the census enumerator. This work is entered on blank schedules, which he fills in with names and other data. The schedules from the enumerators from all parts of the United States were transmitted to Washington by registered mail. Even in the packing a regular system was followed. The blanks which had been filled up were laid one upon the other on a piece of straw board. Each pile contained the schedules of a single enumerator. On top of all was placed an empty portfolio, to whose center was pasted the label with the enumerator's name and the designation of his district upon it. The bundle was then corded together and a number of such bundles, representing from 13 to 15 enumeration and the indexes corresponding thereto will move fordistricts, were placed together in a box which they exactly fitted. The box, 27 inches long and about 18 inches in its other dimensions, properly closed and sealed, was sent in this shape to the Washington office. One bundred such boxes were received daily, and several trucks were kept busy transferring them.

The first operation was the enumeration in gross of the population of the United States, and by the same operation the enumeration of families and of their size. We illustrate the machine on which this work was done. It comprises a key board with a number of keys, numbered from 1 to 20, and upon the face of the machine in front of the operator, 21 dials. The keys work the indexes on the dials by electricity. Three tabulations were made here, one the gross number of people in the United States, another the number of families, and finally the number of families of each number of individuals from 1 to 20. Having a schedule at hand, the operator we may assume sees in it a family of six members; he strikes upon the key number 6. This causes the hands on two of the dials to move. The hand on dial No. 6 moves forward one, indicating that there is one family of 6 members. The hand on the odd dial moves forward 6 divisions, indieating that there are 6 individuals to be accounted for from the schedule in question. As each contact is made a bell rings. In this way the enumeration of families up to 20 members is conducted. The few families exeeeding this are not provided for on the machine, and are so rare that they may, of course, be specially noted. Great dexterity is attained in the use of this machine. It is on this that many operators attain the speed of 50,000 names per day, and the entire count of the United States has now been twice executed on machines of this type, making a total of 64,000,000 of individuals each time.

The next operation involves a classifying of the large number of data contained on the schedules. This work is done by a system of machinery involving the use of perforated cards recalling the lace pattern cards used on lace machines. For ages, race, and all other data, such as diseases or other particulars, a card is punched for each person on the schedules. The apparatus used we illustrate, together with a representation of the punched card. In front of the operator is a perforated plate, each of whose perforations has a designation tude of the work may be inferred from the fact that marked at its side.

five between. These are used to designate age. On another portion of the board the 18 divisions of the earth as adopted for the uses of the census are given for the purpose of tabulating nationalities. The same system is carried out to cover all the cases that may be named upon the schedule. The range and capacity of the machine may be realized from the fact that there are 240 of these apertures. A punch attached to a species of pantograph frame works above this plate, Back of the perforated plate is a place for the insertion of a card, and above the card and attached to the pantograph frame is a second punch. Thus connected to the frame, the second punch reproduces all the movements of the first punch in duplicate on a smaller scale trating an interesting alliance of the abstract and conand within the area of the card. When the first punch crete,

nearest the operator is forced down into any hole of the perforated plate, the punch over the card is forced down through the card, making a corresponding apertures might be made on a single card, it is equally clear only be referred to one race, and only a single age number could be tabulated, the same holding for other data, so that as carried out about 18 or 20 perforations are made in each card.

On the upper corner of the cut will be seen the picture of a perforated card. A skilled operator can read off one of these cards as if it were a book. It tells him if the person referred to is white or black; it tells the age, where born, if literate or illiterate, etc. But as one, templates are provided in which the perforated card can be laid, and the results read through the apertures. In their regular use such reading is un-The cards are used for tabulating results necessary. automatically. The apparatus used for that purpose we also illustrate.

A frame holding a number of depending points corresponding with a certain number only of the 240 possible apertures of a single card is arranged so as to be raised or lowered by a handle. When depressed, the points come in contact with mercury cups, one below each point, making electric contact, and each thereby causes the movement of the index of a specific dial. Thus, when depressed, each of the indexes corresponding to the contact points in use would move forward one division. If, before pressing the handle, an unperforated card were introduced, none of the contacts could be made, and none of the indexes would move. If, however, a perforated card is introduced, wires will descend through such of the perforations as correspond with the contact points in use, and contacts will be made corresponding to the perforations in the card, ward one division. Thus a single depression of the handle, the card being placed, causes its story to be transmitted in whole or in part to the case of dials seen facing the operator. It would be manifestly impracticable to make a single machine of sufficient capacity to include all the tabulations possible. It is here that the specializing system comes into play. A tabulating machine may be, and in practice is always, restricted by the omission of a portion of the contact points to a narrow range of subjects.

As in use at the census bureau, the machine has forty dials, and at most only forty data can be provided for on each. A box divided into compartments may be noticed at the side of the operator. This has lids to its many compartments, which are opened by electricity. As the operator presses the handle, one of the electrical connections, it may be that referring to race or any other desired particular, causes a special compartment of the box to open for the reception of the card just tabulated. Thus the cards are classified for transmission to succeeding machines.

The machines, it will be seen, go no further than to record upon dials. The results, it is obvious, may, at the close of each day, be entered in books from the dials. It will be noticed that the power of introducing or omitting contact points gives the tabulating machines a very large range. This is still further in creased by the assorting case, with its twenty-six lids automatically opened or shut by certain contacts This enables a single machine to sort out cards for as many succeeding machines as there are lids to the case. The same elasticity of function applies to the tabulating of the special schedules. A great number of these are to be treated, and the greatest variety of requirements is embodied in the execution of the ope-

The work of this census is the first ever executed by electricity. In the mere enumeration in gross 15,000,-000 schedules were twice gone over. The count proper began on July 1, and in six weeks the names were counted twice. The figure of 50,000 names per day was reached on one day by forty-three operators. operator, a lady, reached the total of about 80,000 The female clerks averaged about 47,000 names, against 32,000 for the male clerks. The magnisome four thousand employes are engaged in tabulat-As samples of designations, we find one set marked ing results and executing the other operations of the Tt in a stimated nlation world, if scheduled, could be counted by the United States census office in 200 days.

> The early completion of the count was due to the improved appliances by which it was executed. The tabulation of results from the general and special schedules will be still more facilitated by the electric machinery. It lends itself to all modifications of data, and owing to it, it is hoped that the results will be reached and printed in half the time required for the last census. The apparatus was invented by Mr. Herman Hollerith, of Washington, D. C. To a mechanical and electrical inventor the accuracy and early completion of the census work is in great part due, illus-

Eau de Cologne,

The following formulæ are all said to be "the origi-

æ	bl.		
	L		
	Oil of bergamot	150	minima
	Oil of lemon	00	66
	Oil of Portugal	50	66
	Oil of neroli	20	66
	Oil of petit-grain	10	0.0
	Oil of lavender (Eng.)	20	16
	Oil of rosemary	10	66
	Oil of meliess		6.0
	Finest spirit		
	Rose water	14	drachms
	Orange flower water	14	44
	II.		
	Oil of bergamot	100 1	minima
	Oil of lemon	50	66
	Oil of Portugal	30	66
	Oil of petit-grain	10	66
	Oil of lavender	20	64.
	Oil of rosemary	15	66
	Finest spirit	30	OB.
	Rose water	90	lrachma
	Orange flower water	9	80

The above formulæ are for preparing the perfume by the cold method. The proper plan is to add the oils to the spirit in the order in which they are set down, shake well, and set aside for a few days, shaking occasionally before adding the waters. After these are added, again set aside for some time, and, if not perfectly clear, filter.

200		
Oil of Portugal	180	minuma
Oil of bergamot	180	66
Oil of cedrat	120	46
Oil of lemon	120	66
Oil of neroli	190	66
Oil of petit-grain	120	14
Oil of rosemary	240	99.
Oil of lemon	240	66
Finest spirit	10	OX.

This formula is for the preparation of a concentrated eau de Cologne, which will bear dilution with ten times its volume of fine spirit. Dissolve the oils in the 10 oz. of spirit, and set aside for fourteen days, shaking four times a day. Then distill the mixture twice, when the result will be 10 oz. of an exceedingly strong perfume, which improves in odor the longer it is kept, and is specially suited for exportation. It is of good odor when freshly diluted with spirit, but in this case also the odor improves on keeping.

	IV.		
	of bergamot		nims
Oil	of codrat	60	64
Oil	of lemon	60	46
Oil	of lavender	30	66
Oil	of Portugal	60	4.6
Oll	of thyme	4	66.
Oil	of neroli	78	66
	of rosemary		66.
Fin	est spirit	62 01	£.

Mix and distill, then add to the distillate 21/2 oz. of melissa water and 5 oz. orange flower water, and distill again. The product is a very fine eau de Cologne, the formula dating as far back as 1831, but the following goes even farther, viz., to 1818:

ν.		
Oil of neroil	10	minims
Oil of lemon	40	94
Oil of bergamot	50	66
Oil of cedrat		16
Oil of lavender	18	66.
Oil of rosemary	10	66
Melissa water	43	G OE.
Pinest snielt	96	

Dissolve the oils in a spirit contained in a retort, giving the mixture a thorough shaking, then close the retort and keep the contents just warm for forty-eight hours, whereby perfect blending of the oils with the spirit is insured. Then place it for twenty-four hours in a cool place, after which filter it through paper until it is obtained perfectly clear. With the filtrate mix the melissa water.—Chemist and Druggist.

Protection of Mine Timbers from Decay.

The German government mine Altenwald, near Saarbrucken, has, since 1888, conducted a series of experiments to ascertain the most effective means to prevent from decaying the pine timbering, which is tar, tar and carbolineum were tried in such a manner as to enable to compare their relative protective value. The results as published in Zisch. f. d. Berg., Huttenu. Salinenwesen show lime to be the weakest. Coal tar preserved the outside of the timber, while the core was found completely decayed. Carbolineum proved by far the best, and is now being used on all the timbering of the upcast in that mine. .The mine timbers, made of wood peeled and dried, are twice painted over with the carbolineum above ground and require each, when 2.5 meters long and 0.25 meter in diameter, in the first application & kilogramme and in the second } kilogramme, so that, at a price of 34.5 pf. per 1 kilogramme, the total cost was: For material 48'3 pf. and for labor 14 pf., or altogether about \$0.15.

The American Chemical Society.

The first general meeting of the American Chemical Society was held in Newport, R. I., on August 6th and 7th. This event is one of importance in the history of phia), will find delegates from the various local bodies American chemistry. In August, 1874, the centennial of chemistry was celebrated at Priestley's grave, in Northumberland. Pa., and for two days exercises of the most interesting character were held. These included an address on "A Century's Progress in Chemical Theory," by Dr. T. Sterry Hunt; an address on "The Century's Progress in Industrial Chemistry," by Prof. J. Laurence Smith; and one on "American Contributions to Chemistry," by Benjamin Silliman. Dr. Hunt still lives, and urged the Newport meeting, but Laurence Smith and Silliman have passed away. At that meeting "the formation of a chemical society, which should date its origin from this centennial celebration," was proposed, but, after long discussion, the movement failed of success. A few weeks later the American Association for the Advancement of Science established a sub-section of chemistry, the first meeting of the section being held in Detroit, Mich., in August,

The idea of an American chemical society, however, did not die, and two years later the American Chemical Society was organized in New York. Its first president was John W. Draper, and in succession he was followed by J. Laurence Smith, Samuel W. Johnson, T. Sterry Hunt, F. A. Genth, C. F. Chandler, John W. Mallett, James C. Booth, A. B. Prescott, C. A. Goessman, and Henry B. Nason. For a time the society flourished, new members joined, and a satisfactory journal was published, but it finally became practically a local organization, with a membership of nearly two hundred, of which perhaps one-half were non-resident members.

In consequence, other local and special societies were formed. The first of these was the Convention of Agricultural Chemists, which was organized in Washington on July 28, 1880, and out of which has grown the Association of Official Agricultural Chemists that meets annually in Washington, under the auspices of the Department of Agriculture. Its publications are issued by the government. Its objects are: (1) To secure uniformity and accuracy in the methods, results, and modes of statement of analyses of fertilizers, soils, cattle foods, dairy products, and other materials connected with agricultural industry; and (2) to afford opportunity for the discussion of matters of interest to agricultural chemists."

The Chemical Society of Washington was founded in Washington, D. C., on January 12, 1884. Its membership consists chiefly of chemists that are officially connected with the different branches of the government service. Likewise, in Philadelphia, a local organization came in existence as the Chemical Section of the Franklin Institute.

In addition to the foregoing, there is a chemical club in Chicago and a section in chemistry and physics connected with the American Academy of Arts and Sciences, in Boston.

Such was the condition of affairs in 1880, when a committee appointed at the Cleveland meeting of the American Association for the Advancement of Science met the chemical section at Toronto.

Among those who strongly urged the formation of a national organization was vice-pussident Professor Charles E. Munroe, of Newport, R. I., and a general meeting of chemists was called for under the auspices of the American Chemical Society at Newport, R. I.

On the morning of Wednesday, August 6, the assembled chemists were called to order by Professor Charles F. Chandler, a vice-president of the American Chemical Society, and an address of welcome was made by Colonel John Hare Powell, to which an appropriate reply was made by Professor Chandler. The following papers were then read:

On the Determination of the Strength of Various Explosives. Willoughby Walke.

On the Volumetric Composition of Water. E. W. Morley.

On Carbon as an Impurity affecting the Determination of the Atomic Weight of Hydrogen. E. W. Mor-

On a New Form of Air Thermometer for Technical Uses, A. H. Sabine.

On a New Apparatus and an Improved Method for the Estimation of Urea. E. H. Bartley. On Resins. L. H. Frie dburg

In the afternoon the members and guests were taken in a government launch to the United States torpedo station, and made a visit to the United States naval

training school. On the following morning the society convened at 10 o'clock, and at once the discussion of a national chemical society was taken up, Professor C. F. Chandler stating that it was the desire of the American Chemical Society to do what it could toward making itself the

national organization, and describing its history. Finally, on motion by Dr. Elwyn Waller, it was decided to refer the matter "to a committee of conference consisting of three members to be appointed by the chair." This action, on which all parties were agreed,

practically settled the question of an American chemical society, and it is hoped that a second conference, to be held during the coming winter (probably in Philadelpreviously referred to, ready and willing to combine in one single national organization.

The following papers were then read:

On the Perissad Law. W. R. Livermore. On the Relative Intensity of Chemical Action between the Atoms. L. H. Friedburg.

On Butschli's Experimental Imitation of Protoplasm. C. A. Siegfried.

Notes on Water Analysis by the Ammonia Method,

with some New Apparatus. A. A. Breneman. On the Chemical Work of the United States (reological Survey. F. W. Clarke.

On Grass Oils. F. D. Dodge.

On the Action of Nitrils on Organic Acids. C. E. Colby and F. D. Dodge.

On the Influence Method as a Test for Explosives. C. E. Munroe.

On the Use of the Gooch Crucible as a Silver Voitmeter. Morris Loeb. On the Extraction of Indigotin from Commercial In-

T. A. Morgan. On the Uses of Fluorine for the Softening of Hard Water. C. A. Doremus.

In the afternoon the members of the society and their friends were entertained by a sail around Newport Bay in the launch belonging to the U.S. engineers, while a small delegation made a tour of the adjacent island of Canonicut in the torpedo boat Stiletto.

The August Shower of Meteors.

M. B.

The August meteors are believed to originate from large cluster or zone of meteoric bodies which revolves around the sun in an elliptical orbit, extending far beyond the orbit of the remote planet Neptune, and through which the earth plunges annually. It is also believed by most astronomers that these bodies are scattered over the entire path of the cluster to which they belong, but not in equal numbers throughout. The earth is about ten days in passing through the entire cluster, which, from our velocity in space, indicates that the thickness of the cluster is about 16,000,000 miles. As the annual August display usually lasts about six hours, and the earth travels at the rate of 68,000 miles per hour, or 18 miles a second, it follows that the breadth of the meteor stream at the place where the earth crosses it, dense enough to produce a "meteoric shower," is over 400,000 miles. On August 10 each year the earth encounters the elliptical orbit of this meteoric cluster, the major axis of which is fifty times greater than the mean diameter of the earth's orbit. The orbit of the meteors is greatly inclined to that of the earth, and their motion is retrograde, or contrary to that of the earth.

The density of the meteoric cluster-or stream, as some astronomers call it—is believed to be quite small, the average distance of the members from each other having been computed to be more than 100 miles, from which circumstance and the fact, already mentioned, that the stream is spread around the entire orbit, Prof. Newcomb, of the United States Naval Observatory, recognizes decided indications of antiquity in the August meteor stream, as compared with the November cluster, "so that we can say, with considerable probability, that the August group has been in our system at least twenty times longer than the Novem-

Professor Swift, in referring to the August meteoric display, says: "The first August shower mentioned in history occurred on July 25, A. D. 811, and has appeared with unfailing regularity down to our time, except a break of eighty-three years between 841 and 994, and another and much longer one of 310 years. between 933 and 1243, owing, probably, to breaks in the ring, or, which is more likely, to a failure to record them." There are on record a large number of meteoric displays that are believed to belong to the same cluster, and a comparison of the dates affords some indication of a maximum of brilliancy, recurring at intervals of about 108 years.

It is a fact not generally known that the earth pas through a little more than 100 of these meteor streams in the course of its annual journey around the sun. Each of these streams has some particular "radiant point," longs to a distinct system of meteors. Over 100 of these streams have had their orbits determined by astronomers, and others are frequently added to the list already known. From a long series of observations, astronomers have concluded that the earth encounters about 400,000,000 shooting stars-including those that would be seen through the largest telescopes -during its annual journey around the sun. is now known that shooting stars are fragmentary masses, revolving, like the planets, around the sun as a center, which in their course approach the earth, and being drawn by its attraction into our atmosphere are ignited by the heat generated through friction and resistance offered by the compressed air. We never see a shooting star until it enters the atmosphere, vents them from rusting.

when it is heated to incandescence-or becomes "red hot"-and its substance is scattered in powder or smoke, falls to the earth as "meteor dust," or floats about in the atmosphere.

Shooting stars are so called merely from the fact that they resemble the stars in appearance. They enter our atmosphere with a velocity from fifty to a hundred times that of a cannon ball, and previous to this they were dark and invisible, but are almost instantly ignited after their sudden impact, and entirely consumed. their dust gradually falling to the earth. A Russian astronomer has calculated that 4,950 pounds of meteorie dust fall to the earth every hour, which would make fifty-nine tons a day, or more than 21,500 tons in a year, while Professor Proctor considers even this estimate too small. "All know what a shooting star looks like, but no living man can tell us what it really is, for not one has ever been known to reach the earth." The singular fact has been demonstrated that while the most rapid cannon shots scarcely attain a velocity of 600 meters a second—over 1,500 miles an hour—meteorites are known to penetrate the atmosphere with a velocity of 40,000, or even 60,000, meters per second; and the motion of ordinary shooting stars is so extremely rapid that they are consumed and scattered in smoke before they have time to reach the earth. Professor Swift says: "A shooting star is only visible while undergoing the process of combustion, which lasts from one to three seconds, seldom longer. Only while being burned are they visible to us, as then they shine by their own light. Shooting stars move in all directions, and at velocities probably equal to the earth's-nearly nineteen miles a second. One moving retrograde therefore (from east to west) would plunge into the atmosphere at a relative velocity of some thirty-eight miles a second, and, if allowance be made for accelerated motion, caused by the earth's attraction, probably double that, or seventy-five miles a second. The encounter is fearful, and but for the atmosphere, which acts as a cushion, the effect would be disastrous, for not less than 800,000,000 would rain upon the earth every day."

The actual diameter of the largest meteor or "fire ball" is estimated by Humboldt to vary from five hundred to twenty-eight thousand feet. Others allow a diameter of about a mile. Shooting stars are much smaller, their weight varying from thirty grains to seven pounds. Professor Harkness, who has devoted many years to the study of this subject, estimates that the average weight of ordinary shooting stars does not differ much from one grain, so that the minuteness of these curious celestial objects may be easily imagined. Shooting stars are the smallest celestial bodies known to astronomers, the majority of them being no larger than a pebble, or grain of coarse sand even.

No line of demarkation can be drawn between the smallest shooting star and a brilliant meteor that leaves a luminous train behind. In fact, a "meteor" is simply a large "shooting star." They differ from each other in size, color, direction, train, and velocity, but in astronomical character they are precisely alike, both moving in long orbits like comets, and like comets at all angles to the earth's orbit. Astronomically speaking, a meteor is a small comet, not having, however, the comet's " tail."

Some meteors are so large that they fall to the earth as "aerolites" before the heat produced by friction can convert their substance into vapor. Several have been found, and seen to fall, on various parts of the earth, and a massive specimen weighing 1,635 pounds, or nearly one ton, is preserved in the museum of Yale College. - Inter Ocean.

Improvement in Photo-Etching.

The Papier Zeitung, of Berlin, announces that a discovery has just been made in etching, and especially in photogravure. As usual, the drawing is traced on a plate of zinc, either by an artist or by photography, with any suitable etching ground. This plate, backed with asphaltum, is laid in a bath of dilute acid. It is then put in circuit with a dynamo, the other pole being merely placed in the acid. When a current is allowed to pass, the acid attacks the metal with surprising rapidity. A few minutes suffice to bite the plate, and the depth of the etching can be easily controlled. It appears to us that the action is probably due to the depolarization of the surface of the metal, which in the ordinary method of etching becomes covred with a film of hydrogen, or, at all events, with a number of minute bubbles, which make the biting irregular unless the plate is incessantly rocked and brushed.

Manganese Plating of Iron as a Protection from Rant.

According to our Italian contemporary, Progresso, articles of iron can be protected against rust by sinking them near the negative pole of an electric bath composed of 10 liters of water, 50 grammes of chloride of manganese, and 200 grammes of nitrate of ammonia. Under the influence of the current the bath deposits on the articles a film of metallic manganese which pre-

A BULL WITH TWO MOUTHS.

A New York City butcher recently came into posses sion of the remarkable animal shown in our illustration, being a full-grown bull with two distinct mouths. The mouth proper of the animal is used solely for eating, while the other organ is used only for drinking. The bull is about eighteen months old, weighs 1,200 be economical with the present method of producing with the two lions in red granite which, at the time of

pounds, and is dappled gray in color, the animal, with the exception of one shoulder and the forelegs, being well formed. The regular mouth is of normal size and contains two full sets of teeth, but no liquid ever passes between them. The other mouth, of which an enlarged view is given at the bottom of the picture, is about five inches in diameter, at the end of a protuberance three inches thick, and is situated directly under the neck, about half way between the head and shoulders. There are neither eyes nor ears in connection with this mouth, but there are nostrils, through which the animal breathes as well as through his other nostrils, and a partial set of teeth, although this mouth is only used for drinking. The animal also has double knee and hoof joints. His disposition is said to be quiet and gentle.

*** Tinning of Steel.

The tinning of hard steel is advocated by a writer in one of the English mechanical papers, on the ground that a bath of melted tin will not injure the temper or materially soften hardened steel surfaces, the fact being that tin melts at 442 degrees and polished steel acquires straw color at 460 degrees F. In carrying out this process the iron or steel article is first freed from scale by means of a pickle of dilute sulphuric acid and the scratch brush or sand; or, if the articles are of steel and have been quenched or hardened in oil, every trace of this is first removed by immersion in a boiling soda lye and the surface made chemically clean; even the film of oxide due to a pale straw color will prevent the perfect adherence of the tin to the steel. The bath consists of one part hydrochloric acid to about twenty parts of water; in this the article is held for a

withdrawn, and, while still wet, immersed instantly in a ladieful of meited tin, the surface of this being kept from oxidizing by a flush of good, clean tallow. Care is necessary not to overheat the tin beyond the proper melting temperature, and in less than half a minute the article, when withdrawn, is found completely tinned.

ELECTRICALLY HEATED SAD IRONS.

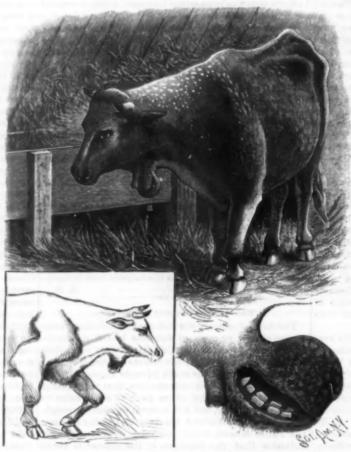
The applications of electricity to the uses of the arts are augmenting with surprising rapidity, and many of

apolis, and which we illus trate from a photo plate given in the Western Electrician. The general method of conducting the electricity into the pressing iron is seen in the foreground of our pieture. A spring rod stands upon each table, and to this rod the electrical wires are connected, running thence into the pressing iron as shown. The electrical current is made to pass through a zigzag wire resistance composed of a large amount of wire, which is so arranged within the pressing iron as not to come in contact with any portion of the shell of the iron. The resistance wire is raised to incandescence by the electrical current, and the caloric thus generated heats the pressing iron to the required degree. The interior of the pressing fron contains what is termed a compressing plate, and this with other devices constitutes such an arrange

ment of parts that the electrical resistance increases losses, which in ordinary practice are nearly equal. . In 20,000,000. The engine used is capable of handling with an increase of temperature, and the apparatus is the electric iron, where the top and sides of the iron do 175,000 to 200,000 bushels of grain per day, or enough made self-regulating, so far as temperature is concerned. When the working parts are cold, the registance cannot become much heated until the compressing plate becomes hot, which reacts upon the resistance, raising its temperature, which in turn increases its resistance and checks the flow of current. The

tory. In addition to pressing irons, the invention is quickly heats the surface plate when required for use. applied to a number of household appliances

It has heretofore been thought by practical electrical engineers and others that electric heating could not



A BULL WITH TWO MOUTHS.

is still economical, from the fact that, if properly conapparatus can be used in doing useful work, while with gas, for example, this is not the case. This fact will be appreciated in considering the great loss in the heating irons are used with one operator. The surface of these frons is radiating heat, the one losing heat for this these applications are of an ingenious and interesting from the top and sides, principally by radiation while nature. One of the latest electrical improvements is the in use, and by conduction in evaporating moisture in in the clothing factory of F. P. Seavey & Co., Minne- there are two radiations and one conduction, or three enough on the bases of the two monuments to prove



ELECTRICALLY HEATED SAD IRONS.

soldering irons, especially where the heat is confined to vator in ten hours. the point of the iron.

Great saving is also found in the use of the electric plant was installed by the Carpenter-Nevens Electro- current for baking griddle cakes, the electric iron con-

Heating Company, of Minneapolis. C. E. Carpenter sisting of a very thin plate, under which the heat is is the inventor of the irons which are used in the fac- distributed almost perfectly and equally. It very

The Egyptian Lions, British Museum.

Dr. Rüppell was the first who made us acquainted

his journey in Nubia, were lying among the ruins of the temples at Mount Barkal, near the isle of Meros. That traveler stated that when he saw the lions, one of them was broken to pieces, and that the line of hieroglyphics which was on the base of the other could no longer be deciphered. Lord Prudhoe, who instantly perceived the value of these monuments, drew them from the ruins in which they lay buried, and carried them to England. There, after having all the fragments put together by skillful hands, this zealous patron of art and science, to whom the study of Egyptian antiquities in particular is deeply indebted, presented to the British Museum the two monuments perfectly restored, and constituting the most beautiful and noble specimens of Egyptian art. In going through the vast galleries of the British Museum, in which the masterpieces of Greek and Roman sculpture attract our eyes on all sides, and still serve as models to young artists desirous to find out the secrets by which the great masters of ancient art have rendered their productions immortal, we are everywhere carried away with admiration, particularly when, on entering the great hall of the marbles of the Parthenon, we find ourselves at once carried back to the age of Pericles, at which time the arts of Greece had reached their perfection. But these impressions, though augmented by the good taste which has arranged all the objects, will not prevent the visitor from stopping with reverential awe before the two lions of red granite which guard on each side the entrance to the grand gallery containing the colossal monuments of ancient Egypt, couched on their pedestals, the one lying on his right, the other on his left side, with their heads turned toward the

few seconds by means of a pair of brazing tongs, then current. While there is twice as much heat in gas and spectator; they seemed more like petrified animals than other means of heating as electricity, the electric heater the work of a sculptor. I do not believe that there exists in any European museum any monument so structed, all of the electrical energy supplied to such likely to change the opinion of those who see nothing in Egyptian art but a servile and tasteless imitation of forms consecrated by religion in the infancy of art and civilization, and who ascribe to the influence of the of such utensils as sad irons. For example, in laundries Greeks whatever traces of an elevated style are to be where gas is quite generally used for this purpose two found in Egyptian monuments. It was this prejudice which led M. Rüppeli to conclude, while he stood in the midst of the finest remains of the times of the Phareason while being heated, and the other losing heat raohs, that these lions must have been sculptured under the influence of the Greeks. But if the royal names inscribed on their breasts seem to approach heating of pressing from, which has been introduced the material ironed. It will be seen, therefore, that the age of Psammetichus, there are still inscriptions

> to us that they ascend at least to the seventeenth century before our era, and that we certainly admire in them productions of the best epoch of ancient Egyptian sculpture, monuments which have resisted the ravages of more than five and thirty centuries. -C. Leemans.

THE largest grain elevator in the world was built at Minneapolis Junction in 1886. The building is 336 feet long, 92 feet wide, and 175 feet high. It has storage capacity for 2,000,000 bushels of grain within its walls. During its construction the carpenters and joiners used over 6,500,000 feet of lumber of all kinds, besides thirty-two car loads of nails, which, if packed, would make the enormous amount of 10,000 common kegs; the best calculators say that the actual number of nails used in the mighty building will fall but few, if any, under

not become heated, two of these losses have been during the year to equal the combined products of the eliminated, a result which makes it more economical. State of Minnesota and the two Dakotas. Two hun-The same fact may be stated regarding the use of dred and fifty cars have often been loaded at this ele-

To make paint stick to bright metal tin roofs, sand

The remarkable burial of Pompeil by the ashes thrown up during a volcanic eruption of Mt. Vesuvius, A. D. 79, and the uncovering of a large portion of the buried city within recent years, have furnished us with much information that was unattainable from any other source, as to the social condition and surroundings and the manner of living among the better class of Romans of eighteen hundred years ago. The city was but little over a hundred miles from Rome, in Southern Italy, in a location of unsurpassed beauty, and was a fashionable resort of the noble and wealthy, so that a large proportion of the buildings were on a magnificent scale and lavishly decorated. The manner in which the city was buried by the ashes had the effect of preserving, to a great extent, the actual form and appearance of all objects just as they were on the day of their entombment in the ashes of the volcano, many of the inhabitants being suffocated and their tolerably preserved remains fixed in the positions occupied by the individuals at the time in their several

large ground area. On the roof of the front part of the building is the "solarium," or sun terrace, caryatides supporting trellises and vases alternating with them holding vines which grow in trained festoons around the roof garden.

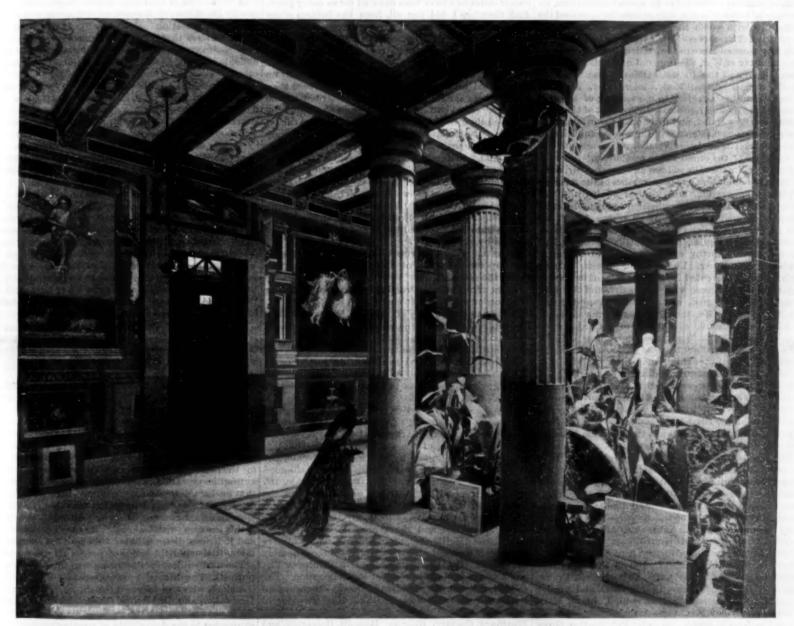
On entering the vestibule the visitor is greeted by a fierce dog in reproduction mosaic. Beneath is the warning "Cave Canem." On the walls are brackets holding busts of "The Great and the Good," including Cicero, Socrates, Plato and Homer. Drawing aside rich portieres, "Salve" in mosaic welcomes the visitor into the atrium or main hall. A bewildering vista stretches before him. Across the marble pavement to the fountain, through the tablinum to the group of pillars of the peristyle, across the vecus or banquet hall, to the rear walls of the hortus, or garden, nearly two hundred feet, the eye vainly struggles to absorb the details of ornament.

The beauty is enhanced by rich vases, frescoes, bronzes, statuary and foliage, scattered in harmonious pro-

REPRODUCTION OF AN OLD POMPEIAN RESIDENCE. the structure, and thus one such residence occupied a thus indicated. The twisting and bending in this case were done hot, there being nothing in the specimens but a judicious mixture of good irons and the absence of old scrap-the fact being also stated that the irons in question represent the daily meltings of the foundry from which they came, all the stoves produced there having their plates of the same metal which exhibits this peculiar toughness. It is not asserted that, because the metal will bear a torsional strain of the kind described, it is, therefore, unbreakable, there being, of course, a limit to its remarkable elasticity.

The Transfer of Industries.

The transfer of industries is one of the most strongly marked and distinctive features in modern industrial life. Its economic causes are to be found in the exhaustion of local supplies, the development of new areas, and the changing centers of commercial distribution. The industrial decline of New England is in obedience to the laws named. Its iron and steel manuavocations. On this account excavations on the site of fusion in the main courts and in the wide halls opening factories are largely things of the past. A few years



VIEW IN A POMPEIAN HOUSE OF EIGHTEEN HUNDRED YEARS AGO, AS REPRODUCED AT SARATOGA SPRINGS, N. Y.

terest, and in their revelations we seem to be brought face to face with actual life at a time when the glory of imperial Rome was at its height.

One of the many private houses thus uncovered by the excavations was the "House of Pansa," which has and the completeness of its plan. This structure has Moorish Villa and the Hotel Cordova at St. Augus-'la., and our illustration represents a view made direct from a photograph taken in the new-old house. The difficulties of the task have been very great, but they have been overcome by the employment of capable artists and the making of repeated visits to Pom pell, together with studies of the various collections in the Italian museums and the British Museum. Our view represents what is called the peristylium, a central court or hall with twelve columns inclosing a space with Pan and satyr among the verdure. Here were given private entertainments, when the colonnade was festooned with garlands of roses and gay with birds of gorgeous plumage.

Generally the houses of this period consisted of but

the buried city have been prosecuted with unusual in- on either hand. Passing through the spacious halls ago, three-fourths of the steam boilers made in the and courts, the visitor can follow in detail the life of the Roman noble, from his worship before the Temple of Jove in the Forum to the utensils of his kitchen or his pleasures, represented by carved ivory tickets, to his seat in the amphitheater. Every household article become among the best known from its great extent is executed with an artistic grace which reaches the acme of elegance. Even colanders and frying pans are now been reproduced in Saratoga Springs by Mr. decorated with graceful designs. The taste of these Franklin W. Smith, of Boston, the builder of the details proves a study of Greek art by the makers, whereas in our mechanical age the skill of the artisan the artist is ever plified in bonu

Toughness in Cast Iron.

Some specimens of cast iron, which exhibit unusual properties, produced at one of the great stove manufactories in Albany, N. Y., have excited much interest, the pieces, of metal being about 1 inch in width, 1/4 inch in thickness, and some 15 or 18 inches in length. Of these strips, some were twisted so as to form spirals, and others were wrapped upon coils. That cast iron can be made very tough, and even a certain amount of elasticity be imparted to it, is, of course, well known, but it is unusual, if not unprecedented, for any metal one story, but with extra sleeping rooms over a part of employed in stove foundries to bear such tests as those Steel.

country were made in New England. Machine shop, planing mill machinery, and steam engines were among its most prominent and thriving industries. Now they are bought in Pennsylvania and Ohio.

The oldest iron manufacturing works in Massachusetts is being transferred to Kentucky. It was founded by Cyrus Elder, who was an expert in the making of gun metal, and in the South Boston Iron Works produced the best of naval, siege, and field guns. Some 200 men are employed at these works, and the removal plant is not a co but the necessity of getting nearer to the base of its supplies of coal and ore. Proximity to the source of supply is in many cases the only escape from the intense and ruthless competition of modern times, and what is true of the iron industries is applicable to all other branches of manufacture.

The deportation of manufactures from the Eastern States to the West and South will largely change the old centers of wealth and industry. These displacements may entail some local misfortune, and break up some time-honored establishments, but in a general and national sense the distribution of industries is an economic necessity and an industrial blessing,-Age of

The International Medical Congress in Berlin. An interesting event in the medical world has been

the meeting of the International Medical Congress in Berlin, and the medical exhibition in connection there with. We give a brief abstract from the Lancet:

The medical exhibition was opened on Saturday, August 2, in the central hall of the Exhibition Palace, in the park between Berlin and the northwestern suburb, Moabit. The Home Minister, the Minister of Commerce, the Rector of the University, the Belgian envoy, Dr. Weber, of Besancon, Surgeon-General Professor Kelsch, of Paris, the anatomist Teichmann, of Krakow, the members of the organization committee of the congress, and many other eminent medical men and official dignitaries were present. The hall was filled by members of the congress and others specially interested in the exhibition. The band of the Czar Alexander's Prussian Grenadiers opened the ceremony with Beethoven's hymn, "The heavens are telling the glory of God."

Dr. Oscar Lassar, the indefatigable secretary of the exhibition committee, addressed the assembly. After a short allusion to the value of special exhibitions, especially of those of a scientific nature, he described the difficulties with which the present exhibition has had to contend. The success of the enterprise had been due in a very great measure to the participation of the Prussian Ministry of War, the Imperial navy, the Bavarian government and the Imperial Office of Health. Synthetic chemistry, pathology, microscopy, and the whole apparatus auxiliary to the tending of the sick were eminently well represented. The task of the committee was now ended, and he handed the catalogue as a symbol of the transference of the whole exhibition to Privy Conneilor Professor Virchow, who accepted it in the name of the organization committee.

Professor Virchow, in addressing the assembly, commended the resolution and perseverance of the minister of religion, education, and medical affairs, who had always shown a firm determination to make the exhibition an accomplished fact at all costs. Almost all the governments in the world had interested themselves in the enterprise, but especially Germany had shown herself worthy of the occasion in the most praiseworthy manner. The Emperor himself, though unfortunately prevented from being present in person, regarded the congress with sympathy, and the Empress took a very great and practical interest in all hospital matters. He, therefore, begged the assembly to join him in the cry, "Long life to his Majesty the Emperor William!" When the loud cheers and the tones of the national anthem had died away, Professor Virchow declared the exhibition opened.

Privy Councilor Koehler, director of the imperial office of health, then welcomed the assembly in the name of the imperial and of the Prussian government.

The audience then rose, and were conducted by the gentlemen of the committee, amid the strains of the march in Tannhauser, through the spacious halls of the exhibition.

The opening of the Medical Congress, which took place in Renz's Circus, on Monday, August 4, was a magnificent affair. A multitude of many thousands filled the spacious amphitheater. The places on the arena were reserved for the official dignitaries and the most eminent members of the congress. Of the latter may be named Billroth. Nothnagle, Albert, Meynert, Stork, Winternitz, and Kraft-Ebing, from Austria; Paget, Lister, Macewen, Horsley, Semon, Pavy, Clark, MacCormae, Brunton, and Ord, from England : Bonchard, Dujardin-Beaumetz, Le Fort, Richet, Proust, Apostoli, Ollier, Chauveau, Cornil, Roux, and Nicaise, from France; Mosso, Ceili, Baccelli, Cantani, Maragliano, Golgi, and Foa, from Italy; Thiry and Van Beneden, from Belgium; Stokvis, Pel, Snellen, Guye, Forster, Rosenstein, and Pekelharing, from Holland; Lange, Iversen, and Gent, from Denmark; Laache, Heiberg, and Klauss Hanssen, from Norway; Holmgren, Axel Key, and Retzius, from Sweden; Kocher, Socia, Prevost, Fehling, Fick, Huguenia, and Dufour, Switzerland; Erisman, Heryng, Kraepelin, Schmidt, Barfurt, Unverricht, Dehio, and Danilewski, from Russia; Wood, Knapp, Billings, Bernays, Senn, Keen, Sayre, O'Dwyer, Jacobi, Osler, Stewart, and Loomis, from America. Spain, Portugal, Roumania, Greece, Turkey, Egypt, Japan, Mexico, Texas, Brazil, and Chili are also represented.

The diplomatic corps was numerously represented, the German government by Minister Von Boetticher and State Secretaries Maitzahn and Oehlschlaeger, the Prussian by Gossler, Herrfurth, and Miguel, and the army by Generals Pape and Rauch. The city of Berlin was represented by Burgomaster Forekenbeck and many councilors and deputies, several German universities by their rectors and deans in their official robes. Duke Karl Theodor, of Bavaria, who is an eminent ophthalmic surgeon, and Professor Virehow were greeted by loud clapping of hands, which was repeated when Professor Virehow mounted the platform to declare the congress opened.

Professor Virehow commenced his address by describing the preparations for the congress, and begged in-

to see before him in such numbers, and of such emi-"One," he continued, "who had occupied a public chair in German universities for more than forty years, who recalls to memory numerous losses of the best friends, with whom he has worked, whom he has himself helped to educate, may well deem himself fortunate, if he sees again in this brilliant assembly men who were his teachers, if he beholds living before him representatives of almost all the schools of medical thought which have arisen since then, the originators of almost all the path-opening discoveries which have transmuted the outer form and the inner nature of our science from top to bottom, the greatest investigators and the first practitioners-if he fluds again among the professional brethren who have gathered here from far and near old pupils who have imbibed the spirit of the new time, and developed it to most powerful effect. Yes; I may well say it is a happy day on which it is permitted me, honored by the good opinion of the last congress, and supported by the confidence of my countrymen, to open this congress in the city to which my public endeavors have been devoted for so many years. And therefore I bid you all, from the bottom of my heart, joyfully welcome in my own name, and at the same time in that of the whole organization committee. Be assured that you will be received as dear guests everywhere in our country."

The secretary of the congress delivered his report on the internal affairs of the assembly. No fewer than twenty-three states, he said, are represented in the congress. Amid enthusiastic and prolonged applause, he stated that the French republic had ordered thirty four delegates to attend the congress, including many recognized as authorities far beyond the limits of their fatherland. Besides the official representatives, about 2,500 medical men from Germany were announced, and the number of the foreign guests was about the same. From North America 500 were present, from Russia and England 300. About 1,000 ladies had come. The secretary further stated that Edison's representative would demonstrate his new method of destroying stone concretions by electricity.

In the name of the German empire and by order of the Emperor, Secretary of State Von Boetticher welcomed the assembly.

In the name of the Prussian government, Minister Von Gossler welcomed the congress

In the name of the city of Berlin, Burgomaster Von Forekenbeck welcomed the assembly. He gave a condensed account of the development of the public hygienic institutions of the city.

Dr. Graf then welcomed the assembly in the name of the German Societies of Physicians and Surgeons whose great aim was the improving the position of the profession.

After the secretary of the last Washington congress had spoken, Sir James Paget ascended the platform amid loud applause. He expressed the thanks and assured the assembly of the sympathy of his country men. He was followed by the French delegate, Dr. Bouchard, who in a few hearty words conveyed the good wishes of his countrymen. The Italian delegate, Dr. Baccelli, expressed his gratitude to the congress, the empire, and the president in eloquent classical Latin. The Hungarian delegate, Csatary, greeted the congress in fluent German, and the representatives of Russia and Greece did likewise, after which a representative of the South American states addressed the assembly in Spanish. On Dr. Baccelli's motion, Professor Virchow was then elected president by acclamation. The following bonorary presidents, among others, of all nations, were then elected-Duke Karl Theodor of Bavaria, Paget, Grainger Stewart, Stokes, Billings, Bouchard, Ceatary, Billroth, Baccelli, Holmgren, and

In the section of gynæcology and obstetrics, the president, Dr. Martin (Berlin), in a brief address, welcomed the members. Dr. Galabin (London), who was to have opened the discussion on "Antisepsis in Midwifery," not being present, an abstract of his paper was handed round, in which he insisted on the immense importance of antisepsis, and that it should be thorough-attendants, hands, instruments, etc., being rendered aseptic, douches of sublimate injections (1 in 4,000) being used. Dr. Slawjanski (St. Petersburg) presented a table showing the reduction of the mortality at his hospital since antiseptics were introduced, and ley enumerated the various affections of the brain (frac by Stadfeldt (Copenhagen), Fritson (Breslau), Pippinskeold (Norway), Doederlein (Erlangen), who exhibited photographs of bacterial culture from cases of puerperal septicemia, and Dr. Priestley (London), who referred to the benefit he found on a former visit to the northern hospitals of Europe from the introduction of antisepties; he thought that obstetricians as well as surgeons owed much to Sir Joseph Lister, and recognized the great benefit to students that would follow if by antiseptics or other means large hospitals could be made as safe as small ones.

operation by Pozzi (Paris), who reserved it for exception- actinomyces, and also, by inoculating rabbits with

first to welcome the foreign guests, whom he rejoiced the adjacent tissues were not invaded, but would not employ forced retroflection. Dr. Pean's rising was the signal for a great ovation. He spoke in his usual eloquent and decided manner for ten minutes in favor of the operation, and strongly urged the advantage of forci-pressure, of which he had had a very large experience

Sir J. Lister gave a masterly address on antiseptic treatment in surgery, and Dr. Koch one on bacteriology. Dr. Koch's address treated chiefly of what is already known. The new points were some observations on tuberculosis as observed in the fowl, and on the possible curative treatment of phthisis by drugs. In a series of experiments which he lately conducted, he found that certain bodies, such as volatile oils, and certain metallic salts, such as nitrate of silver and preparations of gold, even in very small doses (1 to 1,000,000 and even less), destroy the tubercle bacilli in a very short time, and he thus believes that it is not impossible that in the course of time some drug may be found which will effectively destroy the bacillus without injuring the body.

In the section of neurology several papers were read, one by Dr. Minor, of Moscow, on syringo-myelia being especially interesting. From a series of five cases Dr. Minor believes that often central hæmato-myelia may give rise to symptoms of syringo-myelia, and that it is difficult sometimes to distinguish the one from the

In the section of pathological anatomy a discussion took place on the part which leucocytes play in inflammation.

In the section of medicine Professor Leyden, in a few well chosen words, welcomed the members, and spoke of the aim of medicine. He especially dwelt on the importance of the constitutional, hygienic, and dietetic treatment, which was now receiving more attention

In the section of medicine Lepine and Grainger Stewart opened the discussion on "The Treatment of Bright's Disease," and Professors Rosenstein (Leyden), Senator (Berlin), and Aufrecht (Magdeburg) joined in the discussion. The subject having so recently been discussed at the German Congress of Medicine at Vienna, the speakers confined themselves to a few points. Professor Grainger Stewart dwelt especially on the avoidance of chills and exposure to cold, and on the dietetic treatment. The diets he was in the habit of ordering may be grouped under four heads:

Diet.	Albamen,	Carbohydrates,	Fats.
1. Ordinary	4 665 or.	10°65 oz.	3:32
2. Large	6'86 **	18-07 **	4.6
8. Milk	32 "	8'84 "	2 96
4. Low	2'494 "	36'06 **	2-202

And of these the best result he obtained by combination of diets 3 and 4. Diets 1 and 2 increase the albumen and urea and are hence unsuitable. Pure milk diet may do harm by giving rise to gastrie disturbance, producing constipation, hence he gives it at short intervals and diluted with water. Iron can be given to relieve the ansemia. Diaphoretics are to be recommended, and for the relief of the anasarea and dropsies, tapping with antiseptic precautions. Rosenstein does not believe that medicinal treatment does any good in Bright's disease, as there is no drug which has any effect on the albuminuria, but many drugs may do harm, especially is this the case with calomel. He advises rest in bed and judicious diet. Senator believes that in cases of interstitial nephritis, iodide of potassium will do good.

The next subject for discussion was the treatment of phthisis. The discussion was opened by Dr. H. Weber (London), who was followed by Professor Leyden, Dr. Dettweiler, and Dr. Neffzel (New York). Dr. Weber. while not underrating the value of climate, gave strong expression to the desirability of treating phthisical patients in institutions especially adapted by situation, etc. He strongly advocated the establishment of such hospitals as that at Ventnor, to be made accessible to the poorer classes. All the other speakers who followed also spoke to the same effect.

The section of surgery, neurology, and physiology combined to hear the opening of the discussion on cerebral surgery, by Professor V. Horsley. Professor Horsley's able address was fully illustrated by lantern slides, and for the guidance of the members he had drawn up tables, so that, as the subject is a very large one, special points could be discussed. Professor Horsspoke in favor of sublimate solution. He was followed tures, homorrhages, inflammatory focal lesions, septic meningitis, epilepsy, cephalalgia, tumors, etc.) where surgical interference is indicated, and briefly dwelt on those lesions of the vertebral column and cord which required operation. The address formed one of the chief features of the congress, and the members testified their appreciation by rising from their seats.

In the section of medicine Dr. Adam Kiwitz gave a paper on intracranial pressure, and Drs. Ebstein and Nicolaier gave a demonstration on renal and cystic calculi produced by feeding animals on oxamid.

In the section of pathological anatomy Dr. Max Dr. Schauta (Prague) spoke strongly in favor of the Wolff showed that he had succeeded in cultivating dulgence for whatever defects there might be. He had aleases, owing to its risk and the difficulty of being sure pure cultivations, in producing typical actinomycosis.

New American Ships of War.

Under the recent act of Congress the plans for the three new battle ships are being rapidly developed and prepared. When Secretary Tracy issued his circular on the 1st of July inviting proposals to construct the ships, further details were promised for the information of bidders. The promptness with which the call was published and the general plans were announced has given much satisfaction.

The act provided that the three vessels should each have about 8,500 tons displacement. The actual plans contemplate about 9,000 tons displacement, with the same limit of cost, which is \$4,000,000 each, exclusive of armament and speed premiums. This will allow a length of 333 feet on the load water line, an extreme beam of 69 feet, and a mean draught of 34. The bull is to be of steel, unsheathed, with bracket framing, and double bottom from armor shelf to armor shelf fore and aft.

The armor at the water line is a belt of steel seven feet in breadth and eighteen inches thick, with an added one and a half inches behind the wood backing. The transverse armor at the ends of the belt will be fourteen inches thick, while from the belt to the main deck there is five and a half inch armor on the side, backed by a broad bunker of coal. A curved three inch armored deck extends fore and aft from the ends of the water line belt over the engines and boilers, its edges meeting the ship's sides below the water line. Above this deck come the heavy redoubts and barbette turrets, protecting the loading positions of the guns. It is clear, therefore, that these vessels are to be heavily armored, in the true modern sense.

The battery of each vessel will mark a great advance over anything yet attempted in our navy, consisting of four 13 inch, four 8 inch, and four 6 inch breechloading rifles. The 18 inch guns will be in harbette turrets, 17 inches thick, and with the armor inclined so as to offer a resistance of 19 inches to horizontal fire. The barbettes and shields of the 8 inch guns will be 6 inches thick, and those of the 6 inch guns 4 inches thick. The secondary batteries will include twentyeight guns, consisting of twenty 6 pounder and six 1 pounder rapid-fire guns and two Gatlings. Twelve torpedoes will be carried.

The speed will be at least fifteen knots, maintained along the series of pins by which the upper ends of the one half forms a lid to the other. This is fixed firmly

for four consecutive hours, and produced by twin-screw triple-expansion engines of 7,000 indicated horse power under natural draught and 9,000 under forced draught. At least 400 tons of coal will be carried, and the act of Congress requires a coal endurance of about 5,000 knots at the most economical rate of speed. There will be a single military mast, with two tops, and there will be an armored conning tower. The bids for these vessels may be on plans provided by the Navy Department or on those submitted by the bidder.

Not less interesting in its way is the protected cruiser of 7,300 tons, in which speed is the chief object aimed at. Although the act of Congress calls for the very high rate of twenty-one knots, Chief Engineer Melville has been planning to secure twentytwo knots, although only twenty-one will be guaranteed by the contractor. For this purpose no less than 20,500 horse power, or much more than double what is required of the new battle ships, will be needed. Coil boilers have been thought of for a part of her boiler equipment, and the new device of three screws, each connected with a separate triple-expansion engine, as in some of the latest French and Italian ships, is relied upon to aid in producing the expected speed. The chief protection for this vessel, in addition to its great supply of coal, which is 750 tons, arranged in bunkers so as to shield the machinery, will be an armored deck of about four inches maximum thickness. The armament of this cruiser is inferior to that of some smaller but less swift vessels, the main battery consisting only of four 6 inch rifled breech loaders and eight 4 inch rapidfire guns. Like the three battle ships, and the two other large vessels recently contracted for, she will have a belt of woodite or an equivalent material on the slopes of her protective deck.

Taking together the three battle ships, this very fast protected cruiser, the fast 8,100 ton armored cruiser, whose construction was awarded to Cramp & Sons two

the Union Iron Works, the work of the present summer will be represented by half a dozen of the finest vessels looked for in 1898, or in 1894 at the furthest.

world. It contains 2,500,000 volumes.

JAPANESE PORTIERE OR CURTAIN.

There is a certain delicacy in a curtain made of long lashes formed of straw or bamboo and beads which is not found in a fabric of any kind. Curtains of this sort have been largely introduced into this country of late, some of them being simple, plain, and cheap, while others are really very elaborate, and, of course, correspondingly expensive. It is a very simple matter to make a curtain of this class, provided the materials are at hand; but where neither bamboo nor straw nor beads are available, it becomes more difficult. But a

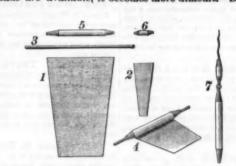


Fig. 2.-METHOD OF MAKING PAPER ROLLS.

very presentable curtain may be made from paper, which is obtainable everywhere. The large engraving shows a very simple pattern made of straws of different length, and glass beads of different colors, strung on strong thread or fine, strong twine.

The first thing to be done toward making the curtain is to draw a design roughly on a sheet of paper, then tie a thread in a bead which is to form the finish of the lower end of the lash. Then the bead is fastened in its place on the pattern by driving an ordinary pin through it into the board or table beneath. stringing of the straws and beads is thus proceeded with according to the requirements of the pattern.

When one lash is finished, its upper end is fastened on the design by an ordinary pin driven through a knot tied in the thread. The next lash in order is proceeded with in the same manner, and so on until the entire series of lashes is done. A stout string is stretched

Fig. 1.—CURTAIN FORMED OF STRAW, BAMBOO OR PAPER, AND BEADS.

whose construction was at the same time awarded to the transverse string. If desired, the threads may be lashes. As all the knots are necessarily trimmed close, of their class in the world, whose completion may be it is well to touch each knot with mucilage. When this is dry, the curtain is finished.

A very handsome curtain may be made from beads straws may be dyed different colors by means of ani- be introduced after the solution has been heated.

line dyes, or by dipping them into thin colored lac quers.

A curtain or portiere of bamboe and beads is made in the same way, but on a larger scale

It is easy to make a good imitation of these curtains with paper tubes and beads, or the tubes alone. The manner of making these tubes is shown in Fig. 2. The paper from which the tubes are made should not be thicker than common writing paper. It may be either colored or white. The best results will be secured by using common white writing paper and coloring the tubes after they are formed, and dry by means of thin brown or white shellae varnish, colored with pigments or the anilines.

The pieces of paper from which the tubes are made are preferably cut in trapezoidal shape, as shown at 1 and 2, so that when the tube is finished it will have conical ends, as shown at 5, 6, and 7. The wire shown at 3 is used as a mandrel upon which to roll the paper. The larger end of the piece of paper is applied to the wire when the paper is rolled up in the manner illustrated at 4. The narrower end of the paper is gummed and pressed down closely, when the wire is removed and the operation is repeated. It is not advantageous to gum the entire surface of the paper. Fastening at the end is sufficient. The wire used as a mandrel should not be more than one-sixteenth inch in diameter, as too large a hole through the rolls allows them to arrange themselves irregularly. At 7 is shown a part of a lash formed of a long tube, a bead, and a short tube.

In stringing both the straws and the paper tubes a long, slim needle will be required. If this is not obtainable, a very good substitute for it may be made by forming an eye or loop on the end of a thin wire of suitable length.

There is scarcely any limit to the amount of labor that may be expended upon an article of this kind; but very pleasing results will be secured by the adoption of simple designs, which may be easily carried

Machine for Mounting Photo Prints.

It consists of a box of any required dimensions, divided in the middle and hinged at the back, so that

> to the work table. On opening it, both top and bottom are found to be subdivided by partitions into as many reservoirs as are necessary for holding each a packet of mounts in the upper half and trimmed prints in the lower compartments. When loaded, and ready for commencing to mount, the box is thrown open, and the packet of prints is found to be pressed up from below, so that the upper one is level with the upper surface of the lower compartment, and having received an application of the mountant from a slab and brush, which are found adjacent, the lid is closed, and a stirrup or foot piece depending from the table is relieved from the pressure of the foot, by which certain springs are allowed to exercise their force, the result being that the starched prints are brought into firm contact with their respective mounts. On reopening the top the mounted prints fall out and are received into a receptacle lined with blotting paper, by which any humidity left on the face of the print is removed, after which they are dropped into a tray standing in readiness to receive them. The starch is then applied to the next set of prints, and the springs liberated by the action of the foot as before, and thus it goes on so long as any prints and mounts remain.

How to Destroy Germs in Water.

Dr. C. G. Currier says, in the Medical Record, that water is easily sterilized by keeping it at or near the boiling point for fifteen minutes. Five minutes' heat is sufficient to destroy all harmful micro-organisms. Still less time suffices to destroy the disease-producing varieties which are recognized as liable to occur in water. Thus merely raising to the boiling point a clear water containing the micro-organisms of malarial disorders, typhoid, cholera, diphtheria, or of suppurative processes, and allowing it to gradually cool, insures the destruction of these germs. They are also destroyed by keeping the water for from a quarter of an hour to half an hour at a tem-

months ago, and the 5,500 ton unarmored cruiser, lashes are secured. Each thread is then tied around perature of 170° C. Occasionally, however, very resistant but harmless bacteria may get into water. The spaced by beads arranged on the string between the brief heating renders them safe for eating purposes; but when it is desired to destroy every micro-organism that may be present in a contaminated water, it should be heated for one hour and allowed to cool slowly. It may then be used for cleansing wounds, or for alka-THE National Library in Paris is the largest in the alone, or from beads and plain uncolored straws, or the loidal solutions, which will keep indefinitely if no germs

work.

RECENTLY PATENTED INVENTIONS. Engineering.

ENGINE .- Adolf F. Stephenson. Stromsburg, Neb. Combined with a supporting frame in which a shaft is mounted are radially arranged cylinders within the frame, the pistons being connected to a single crank arm of the shaft, and the steam chests mounted on the frame outside the cylinders, the engine being designed to utilize the steam to the greatest advantage and be run at a high rate of speed.

STEAM ACTUATED VALVE. - Johann C Grabber and Henri Ruperti, of Kupfernammer, near Brackwede, Germany. This invention relates to cylinder and piston motor engines, and is designed to dispense with the devices heretofore employed to distrithe steam, and to effect its distribution directly from the source of supply alternately to the ends of the cylinder and piston, the device being applicable to single and double acting engines

FRED WATER HEATER. - Cleophas Cancienne, Bertie, La. Combined with a boiler feed pipe arranged in a furnace chamber is an independcut detachable core having radial arms serving as supports for holding the core centrally in the pipe, the construction providing an unusually large area of heat-ing surface relative to the quantity of water passing ugh the supply pipe

REVERSING VALVE. - Augustus L. Engelbach, Leadville, Col. This invention consists of a stide valve and a semi-cylindrical valve seas on which the slide valve operates, and which is mounted to be turned in the steam chest, the valve being simple and durable in construction, effective in operation, and permitting of quickly reversing the engine at any time.

Railway Appliances

PORTABLE STALL - John W. Evers, Rahway, N. J. This is a stall for use in railroad cars. etc., for the transportation of horses and cattle, and designed to be readily set up and knocked down, coneleting of a series of posts each having a screw rod for fastening them in place, partitions to be hooked on op posite posts to form the sides, an auxiliary post to lock the animals in place, and feed bags or troughs held or this post

CAR COUPLING. - Robert L. Breth, Homer City, Pa. Combined with the drawhead is a gate, and a lever connected therewith through the medium of a link that works in a vertical slot in the drawhead, a housing covering the slot and having an aperture through which one arm of the lever passes, the invention being an improvement on a former pa-tented invention of the same inventor.

Mechanical,

DIE STOCK. - James M. Carpenter, Pawtucket, R. I. This die stock has guides to hold a bolt in position so that the thread will be accurately cut thereon, the guides having an easy means of opera-tion, there being also provision made for fixing the position of the guides and regulating their friction

SHEARS.-William G. Koelsch, Albany. and Philip Shafer, Bath-on-the-Hudson, N. Y. By this invention novel means are employed to secure tension of the two blades in juxtaposition with and as they pass each other, a spring tension catch engaging with the joint pin, restraining the latter from turning and throwing the friction and wear upon the head of the pin.

CROSSCUT SAW. - William A. Miller, Wapinitia, Oregon. This invention covers a peculia conformation of the teeth and the manner of setting conformation of the teem and the manner of setting them, with regard to the blade of the saw, whereby the saw is designed to cut rapidly, with but little frictional resistance, the saw requiring less fling than saws in ordinary use, and being manufactured without increased

PLANE. - Otto Skattebo, Hannaford, North Dakota. In this plane a longitudinal guide is adapted to be held parallel with or at any desired angle to the stock, a separable hinge joint connecting the two parts when the guide is to be held at an angle, and there being rods and set screws for holding the guide in the desired position, the device being equally efficient as a square or bevel plane, and a great variety of tools may be inserted, as for matching, wing, beading, etc.

KNIFE SHARPENER, - John Vermeyien, New York City. Combined with a casing having a transverse slot are transverse sharpening rollers within the casing at opposite sides of the slot, and having exterior to the casing toothed operating wheels, with means for locking the wheels against turning, the device being simple and durable in construction, con vanient to use, and very effective.

KNIES POLISHER -John Vermenlen. New York City. This is a device in which the knife is polished by inserting and moving transversely its blade between two polishing straps, which are supplied with polishing material from an inclosed hopper, the pres-ence of the polishing straps upon the blade being ad-the music being formed by knobs on removable sheets justed by a screw as desired.

SOLE TRIMMING MACHINE. - Jacob R. Scott, Nyack, N. Y. This is a machine designed to cut the loops of the fuir stitching thread under the channel cover of the under side of the sole, so that the grass, leaves, etc., from lawns, tennis couris, and channel cover can fold on to and be fastened to a similar places, and, when made to follow a lawn surface, the invention consisting of a cutter mounted to turn, and provided with a flange and a lawn or ground perfectly clear. spring-pressed table supporting the sole presented to

MAKING CAST STEEL INGOTS .-Richard B. H. Leighton, Philedelphia, Pa. By this in-vention the mould pit, fitted with suitable moulds, is placed in a frame above or near rotatable rollers releasing the handles, when the spring causes the vigrooved to fit the ingote that fall from the moulds so bration of the receiver and the opening cases the victal may be released from the moulds and ticles of cream against themselves and the sides of the passed through the rollers before it becomes fully set receiver.

or hardened, whereby a solid rolled ingot or finished bar is produced, free from pipe or sponginess.

Miscellaneous.

WAGON BODY. - Zachariah F. Jones, Scottsville, Va. This is a wagon body so constructed as to be easily taken apart and put together section by section, thus enabling it to be handled by one man, and utting its storage in small spa

AXLE LUBRICATOR.-John N. Pringle, e, Ontario, Canada. This lubricator is for the axics of vehicle wheels, the hub having an open with which the lubricator nipple communicates, a cap or top being threaded on the lubricator, while a screw presser is threaded within the lubricator body to force allow, axle grease, or other lubricant out on the axis spindle, the turning of the wheel distrib

CARTRIDGE SHELL RELOADER Charles A. Hussey, Fort Bidwell, Cal. This is a simple, cheap, and durable implement for quickly loading shells, providing means for the ready removal of the exploded cap, for placing in position a cap or primer, for imparting a steady and uniform pressure to wads arranged above the powder and shot and for the holding of the cartridge head when the exploded cap is removed

FLUX OR SOLUTION FOR COATING METALS. -Brady S. Richardson, Scottdale, Penn. vention provides a method of coating articles of iron or other metals with a regular, smooth, and even coating of lead, without previously giving to the metal any preparatory coating or galvanizing, the lead forming closely adherent conting which amalgamates with the on and renders it unoxidizable

BRICK DRIKE .- Phineas Arnold, Canal Dover, Ohio. This drier preferably has three compartments under one roof and independent of one another, whereby the process of drying may be carried on in one ompartment while the next is being emptied and anfilled, or the drying may be carried on in o while the others are idle, means being also provided for drawing off the saturated air from the material in rocess of drying.

A PUMPING ATTACHMENT. - Winfield 3. Overton, Whitestone, N. Y. This is an automatic attachment to be applied to an ordinary buoy or to a ressel, to be operated by the movement of either as it waves, to distribute oil upon the water when applied to a buoy, and when applied to a vesse

MAKING WIRE BRACKS. - Luna J Aderhold, Waco, Ga. This invention provides a ma-chine comprising a bed or support, wire-holding devices, and a revolving lever carrying a fixed guide at one end and twisting devices at its opposite end, to quickly and effectually bend up and straighten wire into V braces suitable for use as bed and fence braces.

METAL CEILING.-Henry S. Northrop, New York City. This is a ceiling made of thin stamped sheets or plates, and is made by combining adjoining plates having parallel beads near their outer edges and flanges projecting beyond the beads, one of the flanges overlapping the other and bearing ornamenation in relief, the ornamentations being separated from each other to afford spaces for the attaching nails.

SHINGLING BRACKET.—Thomas Levi and James W. Murchison, New Westminster, Canada.
This is a bracket adapted for connection with a shingle roof to support a beam or scantling against which the expenier or other workman may rest in shingling or repairing or doing other work on a roof, the brackets eing usually employed in pairs or sets

INDICATOR OR DIRECTORY .- John F. seves and Richard U. J. Gauthreaux, New Orles La. By this invention a rotary frame carrying a series of spring rollers on which are wound bands, in connec-tion with a vertically slotted cylindrical casing, are employed in forming a machine to be set in a public place, and contain, ready for easy inspection, lists of esidents and their addresses, a city map, and such other information as may be useful to a stranger or

INKSTAND AND PRN RACK. - George W. Lindsay, Gainesville, Texas. This is a combination device of one or more inkstands with pen-holding attachments adapted to close the lid of the inkstand when the pen is in position on the rack frame and permit the lid to open by gravity of attached parts

EASEL AND TRIPOD. - Kendall J. Minot, Galveston, Texas. This is a combination of pair of cross bars, a hinged brace for supporting them at any required angle, and an adjustable arrangement for regulating the spread of the bars and of the brace, forming a device which may be used for holding pho-nograph horns of different sizes at any desired height, or for holding a painting, or for the use of an artic

PIANO KEY BOARD ATTACHMENT .asper De Vilbias, Shellaburg, Iowa. This is a devic for mechanically playing a time upon an organ, melodeon or piano, being a simple mechanical attach-ment to be set over the key board and operated by the of flexible material carried by rollers,

LAWN CLEANER. - Charles Bailey, Winnipeg, Canada. This is a light and durable ma-chine designed to effectually clear the refuse, such as mower, to take up all the grass cut, thereby leaving the

CHURN.-Robert Campbell, Mancelona, Mich. In this churn the cream-holding vessel is supported on the upper end of a vertical spring plate, the

FOLDING POULTRY CRATE.-Harry B. Cornish and Samuel M. Higgason, Rutherford, Tenn This is a crate for the transportation of poultry, which when knocked down, will form a compact bundle, and when set up may be made firm in such position, pre-venting abstraction of the contents and indicating if the crate has been tampered with when in use as a ship-ping box or coop for live poultry.

DIPPER HANDLE. - Henry Maycock. New York City. This is a vertical handle, running down to the bottom of the bowl of the dipper, and provided with gange marks to indicate the amount of iquid in the receptacle.

EMBALMING AND COOLING APPARATUS. -Eugene D. Whippie, Creston, Iowa. This is an ap-paratus for undertakers' use, adapted to be packed in small space for convenience in transportation, and which, when arranged for use, may be adjusted to any

ARTIFICIAL TERTH. — E m o r y A. Bryant, Aspen, Col. This invention provides for the attachment of porcelain veneers of artificial teeth to the dummies or pivot teeth, so that in case the venare broken they can be easily replaced without discomfort to the patient, at a small cost, and even by a dentist who has had little or no experience with bridge

TRUSS.-John H. Brownlow and Joel Warner, Ogdensburg, N. Y. This inves a truss whereby the tissues adjacent to the inguinal canal and rings will be compressed from both sides, the truss being also designed to secure the greatest case and comfort to the wearer,

TOY PUZZLE. - Alfred W. Hanington and Arthur E. Southward, New York City. This inrention covers an improvement in the " pig and clover ' class of puzzles, and comprises a series of pens in closed by a gated wall surrounded by an unbroken wall, a number of balls or spheres being adapted to pass through the gates of the inner wall and enter the

UMBRELLA HOLDER. - Frederick W Strong, New York City. This is a device capable of attachment to the side of a car, to the back of a theater seat, or a church pew, or to a rack, in which an umbrella may be conveniently placed and removed therefrom, and consists of a tapering tubular body with a latch door hinged at one side, a key hole slot adapted to fit on a supporting headed stud, and tubes at the bottom to conduct away water accumulating.

SCIENTIFIC AMERICAN BUILDING EDITION.

AUGUST NUMBER .- (No. 58.)

TABLE OF CONTENTS.

1. Elegant plate in colors showing perspective and floor plans of an attractive little cottage recently erected at a cost of only \$900 at Sunapee, N. H., from plans by Munn & Co., architects, New York. Sheet of details, etc.

2. Plate in colors of Mr. Charles Barnard's cottage at Stamford, Conn. Perspective elevation, floor plans, sheet of details, etc. Cost \$2,000.

3. Chateau de Chenonceaux, erected in the reign of

Francisthe First. Page engraving.
4. A cottage at Villa Park, New York. Cost \$3,400 complete. Floor plans, perspective elevation

5. A residence on Chester Hill, Mount Vernon, N. Y Cost \$5,500 complete. Perspective view and floor 6. A block of city residences erected for Dr. F. E.

Robinson, on West End Avenue, New York City. Floor plans and perspective view. General view and details of Festival Hall of the

Union of German Singers at Vienn 8. Residence at Greenwich, Conn. Cost \$7,800. Per

spective and floor plans. 9. Dwelling at Stamford, Conn. Cost \$5,000. Plans

and perspective elevation. 10. A dwelling at Holyoke, Mass., erected at a cost of

A dwelling at Holyoke, Mass., erected at a cost of \$3,500 complete. Rossiter & Wright, New York, architects. Floor plans and perspective view.
 Dwelling and store at Mount Vernon, N. Y. W. S. Stickies, architect, Mount Vernon. Cost \$5,600

complete. Plans and perspective elevation.
In elegant residence erected on the Highlands,

Springfield, Mass., at a cost of \$6,000. Floor plans and perspective view.

18. Attractive stable at Montclair, N. J. Cost com-

plete \$3,200. J. C. Cady, New York, archit

14. Miscellaneous: Steam as a fire extinguisher,-Trees and streets. - Portrait and biographical sketch of John Ruskin. - A porch covered with clematis montana, filustrated. - Prevention of decay in stone,-The porcelain tower at Nankin. The Howard heater, illustrated. - Effective lightning rods. — An improved square chisel mortiser and borer, illustrated.—Zinc and brick work.—The Hartman sliding blinds. — An improved mitering machine, illustrated.—An improved twist machine, illustrated.—An improved heater, illustrated.—A perfect sanitary wash tub. illustrated.-An improved bench plane, illustrated,—A large contract for steel roofing,—New York Central Iron Works Company.

The Scientific American Architects and Builders Edition is issued monthly. \$2.50 a year. Single copi 25 cents. Forty large quarto pages, equal to about two hundred ordinary book pages; forming, practi cally, a large and splendid MAGASINE OF ARCHITEC-TURE, richly adorned with elegant plates in colors and with fine engravings, illustrating the most interesting examples of Modern Architectural Construction and

The Pullness, Richne of this work have won for it the Lanczer Circulation of any Architectural publication in the world. Sold by all newsdealers.

MUNN & CO., PUBLISHER

Business and Personal.

The charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office rly as Thursday morning to appear in next issue.

For Sale—New and second hand iron-working ma-hinery. Prompt delivery. W. P. Davis, Bochester, N.Y. Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. Hoisting Engines. The D. Prisbie Co., New York city.

For best boisting engine. J. S. Mundy, Newark, N. J. Billings' Patent Breech-loading Single Barrel Shot-un. Billings & Spencer Co., Hartford, Conn.

Belting,—A good lot of second hand belting for sale heap. Samuel Roberts, 30 Pearl St., New York.

Best Ice and Refrigerating Machines made by David Boyle, Chicago, Ill. 156 machines in satisfactory use. Steam Hammers, Improved Hydraulic Jacks, and Tube

Expanders. R. Dudgeon, 24 Columbia St., New York. Power presses and dies. Also contractors for special machinery. T. R. & W. J. Baxendale, Bochester, N. Y.

"How to Keep Boilers Clean." Send your address for free 96 p. book. Jas. C. Hotchkiss, 120 Liberty St., N. Y. Screw machines, milling machines, and drill presses The Garvin Mach. Co., Laight and Canal Sts., New York. Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

The Holly Manufacturing Co., of Lockport, N. Y., will send a book of official reports of duty trials of their high duty pumping engines on application

Guild & Garrison, Brooklyn, N. Y., manufacture steam pumps, vacuum pumps, vacuum ap pumps, acid blowers, filter press pumps, etc.

For loss prices on Iron Pipe, Valves, Gates, Fittings, Iron and Brass Castings, and Plumbers' Supplies, w. A. & W. S. Carr Co., 136 and 140 Centre St., New York.

For the original Bogardus Universal Eccentric Mill, ot and Power Presses, Drills, Shears, etc., address J. S. & G. F. Simpson, 26 to 26 Rodney St., Brooklyn, N. Y.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, \$4; Munn & Co., publishers, 361 Broadway, N. Y.

West's lightning rods, 40 Cortlandt St., N. Y., lately saved the Biuff Point Hotel and T. R. McNeil's house. Never fails. Edison, Westinghouse, and others endorse

Gentleman about to open a manufacturers' agency shes to correspond with manufacturers desirous or ing represented in Canada. "Security given." Ad-

Wanted-Assistant manager or superintendent, one thoroughly familiar with the manufacture of brass and iron steam goods, lubricators, oil cups, etc., possessing executive ability and control of men; a good position and liberal salary to an experienced man in one of the eading concerns of the country. Address, giving age, experience and reference, "Ability." care this office.

Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 351 Broadway, New York. Free on application.



HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication.

References to former articles or answers should give date of paper and page or number of question. In uirles not answered in reasonable time should be repeated; corres; ondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of

Wimerals sent for examination should be distinctly marked or labeled.

(2408) "Old Reader" asks: 1. How to nake a good silver plating fluid, that will last for a week or ten days, and that will not tarnish when touched. A. Add ammonia to a solution of nitrate of silver until the precipitate first formed is just rediscolved, 2. The cheap-est and best way to clean tombetones, without injury to the hands, and how to apply it? A. See query 2179. 8. How to clean gilt frames. A. Wash with beer. 4 What will remove ink from paper, without injury to the paper, and how applied? A. A mixture of oxalic and tartaric acids, applied with a camel's hair brush then wash with water applied in same way and blot with thick blotting paper. 5. What is a real good, reliable remedy to keep the hair from falling out? A. There is no universal remedy. See SCIENTIFIC AMERICAN SUP-PLEMENT, Nos. 102 and 338, on the hygiene of the hair and proper manner of preserving it. 6. How to make a preparation for etching names on steel, and will it injure the hands? I want something that will penetrate the steel enough to leave a lasting m ark. How is plied? A. Apply diffute sulphuric acid. It will not injure the hands. 7. How to prepare a liquid or powder to cure perspiring of feet, and is it harmless? A. See

(2404) H. S. asks: 1. What is meant by vulcanized fiber? A. Fiber made by grinding or other-wise reducing wood, which is then made into shape with an intermixture of pitch and heated to make it waterproof. 2. Is parchment paper vulcanized fiber? No. Parchment paper is made by treating paper with a mixture of sulphi uric acid 2 vols., water 1 vol.

(2405) J. W. N. asks how to make a quick-drying polish to finish wood applied without fric-tion. A. Dissolve 4 ounces best shellac in two pluts strong alcohol, add 2 pints linseed oil and 1 pint spirit of turpentine, shake and add 4 ounces sulphuric other (common ether) and 4 ounces aqua ammonia. Shake when used and apply with a sponge lightly.

(2406) H. D. asks (1) for a remedy for ants in a pantry. Of course, nothing dangerous to man will answer. A. Try buhach or crythrum. See our SUPPLEMENT, No. 247. 2. A receipt for rubber stamp ink, both colors and indelible. Have tried various formulas published, but all lack proper body and stay-ing qualities when applied to the pad. The indelible inks sold and made from various formulas come out in inks sold and made from various formulas come out in one or two washings at laundry, though they last some months in the home wash. A. Rubber stamp ink is made from aniline colors and glycerine. As an indeli-ble ink the best printer's ink is to be recommended. 3, How do the collar manufacturers stamp their goods so that their trade mark can never be washed out? A. We presume it is with printer's ink,

(2407) J. K. asks: 1. How can I make rubber hand stamps? The article in Supplement, No. 83, I have found is very good as far as making mould goes. I used unvalcanized rubber, and find it sticks to mould when heated in oven. How can I valcanize it, and prevent sticking to mould? Please explain clearly. A. The unvulcanized rubber should be mixed with vul-canizing material, such as sulphur. The mould should be coated with powdered tale. 2. How high are Niagara Falis? A. American Falis, 164 feet, Canadian falls, 150 feet. 8. What is a good way to get rid of rats? A: If the case is bad, employ a regular rat killer. 4. What is a good inbricant for a clock, that won't become gummy? A. Best sperm oil. 5. I have a straw hat, which became quite yellow in less than a month. How can I get it white again? A. Suspend by threads in a barrel, first dipping the hat in water. Then barn sulphur within the barrel, keeping it covered. 6. I made a solution of quicksilver, nitric acid, and water, which, when applied to brass, gives it the appearance of silver, but does not last. Can you tell me what else to use to make it stay, or can you give another receipt for silver wash which will not come off? A. No mercurial wash is good for anything, and it greatly deteriorates the brass. Use a solution of nitrate of silver to which ammonia has been added, just sufficient to redissolve the precipitate first formed.

TO INVENTORS.

An experience of forty years, and the preparation of more than one hundred thousand applications for pa-tents at home and abroad, enable us to understand the laws and practice on both continents, and to possess un-equaled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all synopels of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., office SCIENTIPIC AMERICAN, 351 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

August 12, 1890,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

[See note at end of list about copies of these patents.]
Adding machine, D. I. Craig. Adding machine, D. I. Craig. Astricultural boiler, Shoudy, Jr., & Millier. 434,251 Astricultural boiler, Shoudy, Jr., & Millier. 434,251 Astricultural boiler, Shoudy, Jr., & Millier. 434,251 Ammeter and voltmeter, G. Pfinnhuche. 434,052 Anti-frietion compound, H. B. Devlan. 434,052 Astricultural and G. K. Kelsea. 435,967 Axic lubricator, J. N. Pringle. 434,105 Axic lubricator, J. N. Pringle. 434,105 Axic apparatus for trimming the fins from dieforced, W. J. Parmelee. 434,105 Bail catcher's mitten, J. W. Saner. 434,120 Barlo tail piece, G. Van Zandt. 434,120 Barlo tail piece, G. Van Zandt. 434,130 Barton and, J. P. Potnam. 434,130 Barton and, J. P. Potnam. 434,130 Bedistand attachment, R. F. Walker. 434,371 Bedistand hospital, F. L. Bryant. 434,130 Bioter, L. G. Rubel. Bioter, L. G. Rubel. Bioter, L. G. Rubel. Bioter, See Serush block. Colling block. Boliter, See Serush block. Boliter, See Agriculture boiler. Bolt or shoe, ventilated, J. A. Johnson. 434,311 Box. See Electic active for box. Salt box. Sheet metal box. Brick drier, P. Arnold Brick imachine, M. B. Atkinson. 434,20 Brick machine, M. B. Atkinson. 434,20 Brick bring his programment of the programment of the principle o
Bicycle, A. D. Barker. 434,234 Binder, L. G. Rubel. 434,160 Binder, paper, T. W. Kelley. 434,80 Biotes. See Brush block. Colling block. Blotter, rotary, E. E. Park. 434,135
Boiler. See Agriculture boiler. Range boiler. Boot or shoe, ventilated, J. A. Johnson. 434,341 Bottle, mucliage, W. F. Litch. 434,189 Box. See Electric safety fuse box. Miter box. Sair box. Sheet metal base box.
Bracelet, S. Whitney
Buoys or vessels, pumping attachment for W &
Burner. See Gas burner. Stove burner. Button, separable, A. Cushman. 434,179 Button, separable, Rhodes & Campbell. 44,202 Button strip, H. W. Gilbert. 434,267 Camera. See Photographic camera.
C. F. A. Roell 434,298 Candle extinguisher, automatic, C. F. A. Roell 434,297 Canning establishments, paring bin structure for,
Car, brake, P. J. Cult
Car brake mechanism, electric street, Illingsworth & Baker T. Bass
Cars and carriages, ventilating railway, S.
Cars, current collecting device for electric, R. M. Hunter Cara, device for the adjustment and testing of electric, T. M. Foote Cars, means for recording moving, C. Kehr. 434,265 Cars, spring motor for, A. F. George. 434,265 Card educing machine, G. Laspenard. 434,065 Cartier See Parcel carrier. 434,065 Cartier See Parcel carrier. Cart, road, Smith & Betts. 434,065

-		
r	Cartridge shell reloader, C. A. Hussey. 434-33 Cash recorder, B. P. Wagner 434-31 Cash register, H. T. Bradley. 434-37 Cash register and indicator, E. Bector. 434-30 Cash registering and advertisement displaying	1
m ir	Cash register, H. T. Bradley	
p	Cash registering and advertisement displaying apparatus, combined, M. A. Drew	
IB.	Cash register and indicator, E. Rector. Cash registering and advertisement displaying apparatus, combined, M. A. Drew. 644,292 Catch snap, A. Timpe. Cattle while being dehorned, machine for hold- ing, H. G. Weich. Colling block, Jacquee & Emmett. Colling block, Jacquee & Emmett. Colling mental, H. S. Northrop. Center board for vessels, J. H. McPartland. Catchier, MacRad separator, T. T. A. Hansen. 654,131 Chain, drive, D. J. Sheldrick. Chair. See Rectining chair.	
	Ceiling block, Jacques & Emmett. 484,181	
n	Center board for vessels, J. H. McPartland	
e	Chair, drive, D. J. Sheldrick. 483,96 Chair, See Reclining chair, Chalk line and reel, M. Nolson. 433,96	
-	Chaik line and reei, M. Neison. 433,966 Chenilie to tulie, machine for applying, H. Perret & al. 434,356	. 1
. 0	Chuck or tool holder, W. F. Schmidt. 434,40 Chuck, tool, Seiders & Hood. 434,03	6 1
	Churn, R. Campbell	
	Clip. See Paper clip. Closet. See Water closet.	
8	Clothes hook, C. Hill	
d	Clutch, electro-magnetic, S. C. C. Currie. 434,385 Clutch, friction, J. Walker. 484,125	Ш
0	Cockeye, clip, E. L. Howe	6.1
	Coin freed or actuated machine, A. Harris. 484,105 Collar fastener, horse, M. W. Bach 434,325 Collar, horse, W. Irvine 484,277 Cork extractor, I. N. Mills 484,192	
-		
1	Water closet coupling. Thill coupling. Water closet coupling. Crate. Coldine, pouter, Cornish & Higgsson	
	Cultivator, A. S. McDermott	
2	Con Sec Oll con	li
8	Cup. See Oil cup. Cutter. See Gear cutter. Tobacco cutter. Dash board, vehicle, G. W. Powell	
	Die stock, J. M. Carpenter 434,33 Digester, J. Hess. 434,27	ш
4	Digger. See Potato digger. Dipper handle, H. Maycock	
	Dish holder, G. W. Carpenter. 438,977 Drawer, furniture, D. M. Esty. 434,044 Dradgers, joint connection for suction pipes and	1
	protectors of, W. P. Humphreys	
	Drier. See Brick drier. Drill. See Expansion drill.	1
r	Digester, J. Hess. 43,371 Digger. See Potato digger. 451,371 Digger. See Potato digger. 451,351 Dish holder, G. W. Carpenter 452,977 Drawer, furniture, D. M. Esty. 561,069 Dredgers, Joint connection for suction pipes and protections of W. P. Humbhreys. 451,069 Drieg. Hee Brick drieg. 46, Rasmussen 551,069 Drieg. Hee Brick drieg. 47, 100,100 Drill blanks, grooving, J. C. Taft. 561,069 Drill blanks, grooving, J. C. Taft. 57, 100,100 Drinking basin for animals, sanitary and automatic, J. A. Quigley 584,072 Dumbwaiter, R. R. Bright. 48, 303 Dust arrester, C. F. Verrell. 50, 100 Dyelog yarn in cops, spindle holder for, I. F. Peck. 544,138	3.4
	Dumbwaiter, R. R. Bright 63,331 Dust arrester, C. F. Verreil 434,216	
	Dyeing yarn in cops, spindle holder for, i. F. Peck. 434,136	
-	Denomination and motors rotation part of E. A. 454,011	1
	Sperry	1.5
1	Sperry. 434,000 Easel and phonograph horn tripod, combined, K. J. Minot. 434,300 Eaves trough, J. Woek. 438,300 Eaves trough, J. Woek. 44,140	11
1	Rgg tester, C. Yakel	
	Electric circuit switch, Lange & Shallenberger 434,151	2
1	Electric circuit awitch, Lange & Shallenberger 434,151 Electric circuits, aafety fuse for, A. Wurts 434,166 Electric conductor subway. G. Westinghouse, Jr. 434,166 Electric conductor terminal, C. A. Liob 438,986	1
	Miectric conductors, closed conduit for, C. J. Van	12
	Depoele 44.416 Depoele 454.976 Ricetric conduit, underground, F. G. C. Zopke 454.976 Ricetric indicator, P. Lange 454, 576 Electric machine protector, L. B. Silliwell 454, 576 Electric match Foote 454, 586 Electric safety fuse box, A. Wurts 454, 576 Electric safety fuse box, A. Wurts 554, 576 Electric safety fuse box, A. Wurts	117
	Electric machine protector, L. B. Belliwell 434, to: Electric motor, T. M. Foote 434,166 Electric affety fuse box, A. Wurts 434,166 Electrical apparatus, core for, C. A. Terry 434,166	18
	Electrical apparatus, cut-out and connecton for,	. 1 2
1	Blectrical distribution, system of, Sashenberger	- 13
٠	hone 434 ffe	-13
1	Electrodes for secondary batteries, making, P.	-14
1	Schoop. 431,301 Elevator. See Grain separator elevator. Water elevator.	
1	elevator, C. Andersen. 434,372 Elevator, R. C. Andersen. 434,372 Embalming and cooling apparatus, E. D. Whip- ple. 434,388	- 11
1	Engine. See Gas engine. Steam engine. Trac-	
1	Engine, A. F. Stephenson	. 16
1	### ACT OF COMPACTOR STATE AND ACT OF THE AC	
1	Exhaust head, P. R. Crawford. 634,042 Exhibitor form, J. J. Wolf. 434,102	
	Exhibitor, merchandise, S. T. Culp 434,415 Expansion drill, C. E. Bowe 434,241	
1	Explosive compound, H. S. Maxim	1.5
	Farm gate, F. W. Byder. 434,496 Faucet, 11. Sch wachheim 434,098 Feed water heater, C. Cancienne 434,319 Feeder, automatic reagent, J. W. Hyatt 424,332	N. S.
	Feeder, automatic reagent, J. W. Hyatt 494.333 Fence machine, hand, M. F. Connett	P
	Fence weaving machine, I. Lehmer	P
	Fertilizer and insecticide, combined, Carlile & Rumph	P
	File cabinet catch, W. I. Ohmer. 433,997 File, paper, F. S. Cooley. 434,379	P
	Fire escape, J. H. Earles 684,416 Fire kindler, W. S. Denton 683,338 Flower pot machine, G. W. Rathsam 434,300 Folding table, J. T. Bon 434,260	P
1	Rumph 684.348 Rumph 685.997 File, paper, F. S. Cooley 645.797 Fire secape J. H. Barles 644.416 Fire kindler, W. S. Denton 654.416 Fire kindler, W. S. Denton 654.30 Flower pot machine, G. W. Rathsam 644.30 Frame 664.30 Frame	19 1
1	Furnace. See Glass melting furnace.	
1	Furnace. See Glass melting furnace. Furnace for burning hydrocarbon oils, J. Schin- neller. Furnace grate and shaker therefor, E. Mather 43,393 Furniture joint, detachable, D. J. C. Arnold 43,239	POR
1	Gauge. See Saw gauge.	RR
1	Gas burner, J. F. Barker	
1	Gate. See Bridge gate. Farm gate. Hydraulic gate. Swinging gate. Gate, H. B. Doolittle	R
11	Geor cutter W W Hastings 434 019	R
1	Generator. See Steam generator. Gig mill, C. Wood. Glass. See Opera glass. Glass, manufacture of plate, J. T. Pennycook 434,400	RRR
1	Glass melting furnace, L. House	R
E	Glove fastening, McIndoe & Emery 34,114 Governor, steam engine, W. J. Creelman 434,222 Grain separator elevator, S. B. Hart 44,083 Grain separating screen, C. Closs. 454,250 to 65,285	R
1	Grain separator, C. Closs	R
1	Glass. See Opera glass. Glass manufacture of blate. J. T. Pennycook. 454,600 Glass melting furnace, L. House. Glove fastening, McIndoe & Emery. 434,134 Governor, steam engine, W. J. Creelman. 434,202 Grain separating screen, C. Closs. 434,236 to 434,202 Grain separating screen, C. Closs. 434,236 to 434,336 Grinder for finger bars and sickle bars for mov- ing and reaping machines, W. S. Williams. 434,124 Frinder for reaper and mover thives, W. 434,230 Grinder for reaper and mover thives, W. 444,235 Grinder for reaper and mover thives, W. 444,125 Grinder grant for the first f	Re
1	chines, knife, E. J. McQuald 434,389 Grinder for reaper and mower knives, W. A. White	Re
1	Grinding machine, C. H. Norton	Ri
1	Halter, W. Gethmann et al	Re
	Hanger. See Lamp hanger. Hanges, L. C. Erwin	Ro
1	Harness, L. C. Erwin	Bo
1	Harrow, M. Daley Harrow, W. D. Napier	Sa
	Harrow tooth holder, spring, P. A. Spicer	Sa Sa Sa
H	Harvester, broom corn, H. Poole. 434,070 Harvester, corn, D. R. Howard. 434,273 Hat band, W. Lawrence. 433,981	Sa Sa
1	lat band, W. Lawrence	Sa
	Heater. See Feedwater heater. Liquid heater. iteating apparatus, water. W. S. Johnson	Sa Sa
li		8c
13	Holeting and transporting mechanism W P Lor-	80
1	Hoisting apparatus, Royce & Connolly	Se Se
ľ	Harrow tooth holder. Paper holder. Pen holder. Pencil holder. Sewing machine	Se Se
1.	Inread holder. Umbrella holder. Washstand spinsher holder.	5e 5e
	Hook. See Cluthes hook. Horse powers or speed regulators, brake for, L.	Ber
1	& A. Y. Gray	Ber Ber
I	Harrow tooth holder. Paper holder. Pen holder. Feneih holder. Sewing machine thread holder. Umbrella holder. Washetand aplasher holder. Holder and bracket combined, E. M. Wright	Ber

8	B		39
110	e harvesting or cutting machine, J. M. & S. B.	Sewing machine thread feeding mechanism, &. B.	
In	Moody	Weich Sewing machine thread holder and cutter, button-	
In	Moody. dicator. See Electric Indicator. Time Indicator. dicator. See Electric Indicator. Time Indicator. dicator or directory, Deeves & Gauthreaux. dicator or directory, Deeves & Gauthreaux. documents of east steel, E. B. H. Leigh- ton. documents of the Electric A. B. H. Leigh- stand, J. Larkir. kstand, J. Larkir. kstand, J. Larkir. kstand and pon rack. combined. G. W. Linday. documents of the Electric A. M. Linday. documents of the Electric A. See See See See See See See See See Se	Sewing machine thread holder and cutter, button- hole, F. W. Roberts. Sewing machine thread tension releaser, N. Whoeler.	434,13
In	gots, manufacture of east steel, R. B. H. Leigh- ton	Sewing machine thread tension releasing device. E. M. Staples. Shade aupport, W. F. Russell. Shaft and wheel coupling H. Uszicker. Shank stiffener, G. H. Stevens. Shaping machine, J. M. Wright. Shack stiffener, G. H. Stevens. Shaping machine, J. M. Wright. Shack stiffener, G. H. Stevens. Shaping machine, J. M. Wright. Shack stiffener, G. J. Hauck, Jr. Shink stiffener, G. J. Hauck, Jr. Shark stiffener, G. J. Hauck, Jr. San and lee Sanger, W. Melntosh. Soap around an anchor, die for compressing, F. W. Ostrom Soie trimming machine, J. R. Scott. Spring motor, J. Isale. Spring motor, J. Isale. Squeezer and strainer, combined, G. Gamlen. Stall, portable, J. W. Kverz Stamb, time, J. D. Mallonee. Stamb, time, J. D. Harve, M. Stambon, L. Alvord, Jr. Stown generator, D. Almy	434,03
In	k well for desks, W. M. Brown	E. M. Staples	434,00
In	aulated conducting wire with lead, machine for	Shade support, W. F. Russell.	433,99
In	sulator, electric, J. K. Dunbar	S Shaft and wheel coupling, H. Uezicker	414,12
Ja	r sealing device, J. W. Fuller	Shaping machine, J. M. Wright	434,03
Je	welry, R. Senner. 434.30	Sheet metal box, C. J. Hauck, Jr.	434,20
Jo	int. See Furniture joint.	Shoe nicking machine, O. E. Seymour.	634,36
K	iln. See Brick kiln. nife polisher, J. Vermenlan	Signal, Paul & Kleinsteuber	473,16
K	nife sharpener, J. Vermoulen	Skate, E. H. Barney	434,28
K	nitting machines, splicing thread attachment for, Merrow & Sanborn	Soap around an anchor, die for compressing, F.	434.08
La	dder, extension roof, J. L. Crafts	8 Sole trimming machine, J. R. Scott	434,38
La	B. White	Spring. See Vehicle spring. Spring motor, J. Isele	434,066
La	mp, incandescent electric, A. L. Reinmann 434,15 mp socket, incandescent, P. Lange 434,15	Squeezer and strainer, combined, G. Gamlen Stall, portable, J. W. Evers	434,128
La	thes or other machinery, guard for, H. S. Hop-	Stamp, time, J. D. Mallones Stanchion, L. Alvord	434,79
La	wn cleaner, C. Bailey	Stand. See Barrel stand. Oil can stand. Show stand. Work stand.	
E	reling instrument, J. Paoli	Steam engine, D. E. Croshy	434,142
L	ght. See Signal light.	Steam trap, D. L. Barnes.	484,371
Li	quid dispensing apparatus, coin-controlled, B.	Stove burner, gas or vapor, C. J. Edmonds	474,256
Li	quid heater, C. Young	Stove or range, cooking, Bergstrom & Hansen	484,177 434,400
La	ock. See Nut lock.	Street sweeper, H. E. Paine	4111.96
Li	om shedding mechanism, Hattersley & Hitt 434,06 bricator. See Axle lubricator.	Studs, etc., fastening device for, F. I. Sherman	434,130
M	bricator, A. C. Busby	Stude steeping or cleaning minorine, 3. v. b. Sthridge Stude etc., fastening device for, F. I. Sherman. Stylographic manifolding, book for, J. L. Wortman Sugar refining, L. Sternberg	484,870
M	eat smoker, C. B. Sims	manifolding, book for, J. L. Wort- man. Swingling, L. Sternberg. Swingling gate, W. A. & H. F. Deema. Switch. See Electric circuit switch. Rallway switch. Tawlich. Epiding tanks, isophys takin.	434,04
34	in, W. P. Kookogey	Switch. See Electric circuit switch. Railway switch.	
34	thographing by means of sand blast, J. L. Mills. 434,15 cks. See Nut lock. our heddle making machine, C. P. Ladd. 434,05 com shedding mechanism, Hattersley & Hill. 434,06 biricator. See Axie lubricator. biricator. A. C. Buzby. 434,00 sliet. S. Rust. 434,00 sat smiter, C. B. Slims. 434,06 cast smiter, C. B. Slims. 434,06 cast centederer, C. Blachoff. 434,33 cast working machine, compound, E. S. Babola, W. P. E. Collega apparatus for burning holes and working machine, compound, E. S. Babola, 434,33 cast smiter, and apparatus for burning holes are self-stated working machine, compound, E. S. Babola, 434,33 cast smiter, and apparatus for burning holes are self-stated working machine, compound, E. S. Babola, 434,30 cast, single self-stated working machine, compound, E. S. Babola, 434,30 cast, single self-stated working machine, compound, E. S. Bitcharden, and a self-stated working machine, compound, E. S. Babola, 434,30 cast, single self-stated working machine, compound, E. S. Bitcharden, and a self-stated working machine, compound, E. S. Babola, 434,30 cast, single self-stated working machine, compound, E. S. Babola, 434,30 cast, single self-stated working machine, compound, E. S. Babola, 434,30 cast, single self-stated working machine, compound, E. S. Babola, and the self-stated working machine, compound, E. S. Babola, and the self-stated working machine, compound, E. S. Babola, and the self-stated working machine, compound, E. S. Babola, and the self-stated working machine, compound, E. S. Babola, and the self-stated working machine, compound, E. S. Babola, and the self-stated working machine, compound, E. S. Babola, and the self-stated working machine, compound, E. S. Babola, and the self-stated working machine, compound, E. S. Babola, and the self-stated working machine, compound, E. S. Babola, and the self-stated working machine, compound, E. S. Babola, and the self-stated working machine, compound, E. S. Babola, and the self-stated working machine, compound, E. S. Babola, and the self-stated working machine,	Table side, extension, J. D. Heckman	434,27
M	son	Target making machine, bird, F. C. Damm.	484,10
M	ill. See Gig mill. Roller mill.	Telegraph, printing, T. M. Foote	434,26
м	E. A. Sperry	Thill coupling, A. Fultz	434.33
M	otals, flux or solution for coating, B. S. Richardson. son. son. 434,29 ster record, I. S. Schrop. 11. See Gig mill. Roller mill. 11. See Gig mill. Roller mill. 11. See Gig mill. Roller mill. 12. A. Sperty. 13. A. S. McMillan. 144,13 13. See First machine mould. 144,13 144	Switch. See Electric circuit switch. Raliway switch. Table. See Folding table. Ironing table. Table slide, extension, J. D. Heckman. Table. See Jag tank. Table. See Jag tank. Tank. See Jag tank. Tank. See Jag tank. Target trap, W. P. Brett. Target trap, W. P. Brett. Target trap, W. P. Brett. Target trap, by Inling, T. M. Foote. Target trap, W. P. Brett. Telegraph, printing, T. M. Foote. Thill coupling, Goney & Jones. Thill coupling, S. D. Webb. Thill coupling, Thill couplin	434,32
M	oney changing machine, J. N. Alsop	Thrashing machines, conveyer attachment for C. J. Hartley.	434,33
M	op wringing attachment for pails, W. F. Ken- drick	Tie. See Rail tie. Railway tie. Time indicator, geographical, E. Plechawaki	484,18
M	usical instrument, mechanical, F. E. P. Ehrlich 433.93	Tooth, artificial, E. A. Bryant	434,19
N	usical instrument, wind, J. Heald	Toy puzzle, Hanington & Southward	434,39
Ne	ard 434,27	Traction engine, J. B. Harris	438,96
N/s	tro-cellulose, machine for the continuous 484,28	rope, A. Bieichert	433,97
N	t lock, S. F. Stever	Trough. See Eaves trough. Trough. See Eaves trough.	
Oi	can stand, M. E. Spofford	Trougers stretcher, J. K. Garson	434,19
Oi	feeder, C. Mueller	Truck, car, G. A. Aenchbacher	484.12
Oi	e concentrator and separator, Hatch & Guion 433.98 ren. portable, J. Middleby 434.02	Trough. See Baves trough. Trousers stretcher, J. K. Garson. Trucks, bolster guide plate for car. E. W. Grieves Truck, car. G. A. Aenchbacher. Truck, railway car. J. A. & G. M. Brill. Truss, Brownlow & Warner. Truss Brownlow & Warner. Tube corrugating machine, Hansen & Wain-	434,31
Pi	ren, portable bake, F. H. Buzzacott	wright. Tube expander, P. H. Benade	484,0R
Pi	int distributer, C. L. Burdick	Tube expander, P. H. Bernde Twist preventer, N. S. Key Typewriting machines, copy holder for, Pipes &	484,37
Pi	nsical instrument, wind, J. Heald	Pernot. Umbreila holder, F. W. Strong	434.90
Pi	per guide and envelope holder, E. Johnson 433,94	Valve for engines, slide, O. L. Ward Valve, reversing, A. L. Engelbach Valve, steam-actuated, G. S. Faulkner. Valve, steam-actuated, Grabner & Ruperti.	484,726
Pi	per solder and cutter, roll, F. W. Drosten	Vaive, steam-actuated, G. S. Faulkner. Vaive, steam-actuated, Grabner & Rupertl. Varnish, W. D. Field. Varnish, W. D. Field. Vault or cell for outhouses, T. W. Carrico. Vall to reli for outhouses, T. W. Carrico. Vall to reli for outhouses, T. W. Carrico. Vall to relifer to the control of th	434,0HE 434,385
Po	on, cyclostyle, D. Gestetner	Varian, W. D. Field Vault or cell for outhouses, T. W. Carrico	434,334
Pe	oncil holder, C. M. E. Gieson	Vehicle power gearing, E. A. Sperry 434,007,	434,00
Pi	notographic camera, O. Plaul	Vehicle spring, I. L. Biakeslee	434,23
Pi	otographic printing frame, W. H. Lewis 434,18 anos, key board attachment for, C. De Vilbiss 434,48	Velocipede, J. F. Raubut Velocipede wheel, A. Carpentier	433,96
Pi	le driver, W. H. Blair	Vending machine, F. G. Dieterich	434,12
Pi	pe exhaust head, steam, E. Rutsler	Wagon brake, J. W. Avis Wagon brake, J. R. Wade	434,05
Pl	stol, cap, C. M. Rider	Wagon body, Z. F. Jones	434,80
Pla	nier, corn, W. M. Harsin	Wagon seat riser, Handy & Sherman	474,15
Pic	otter, L. F. Rondinella	Watch key, stem winding, G. H. Bemington	424,750
Pi	ows, fertilizer attachment for, J. E. Peil 434,29	Water closet coupling, J. J. Ricketts 484,116,	434,11
Po	tato digger, I. J. Trepch	Hughes	434,020
Pr	nting mechanism, address, E. Woodward 434,415 otector. See Electric machine protector.	Water closets, etc., flushing device for, W. C. Hughes. Water closets, seat connection for, W. Soott Water clevator, G. W. Gale. Water wheel, D. A. Van Kiesk. Water wheel fovernor, T. H. Coulter. Wheel, See Car wheel, Vehicle wheel, Velocipede wheel. Water wheel, Wind wheel, I. W. Gatlin. Windlass, ship's, J. W. Yewell. Wire brakes, machine for making, L. J. Aderhold.	484,025
Pu	lley, clutch, F. Kruse	Water wheel governor, T. H. Coulter	434,381
Pu	mp head, S. W. Martin	Wheel. See Car wheel. Vehicle wheel. Veloci- pede wheel. Water wheel. Wind wheel.	
Pu	mping engines, means for operating, J. F. 494 200	Wind wheel, L. M. Gattin. Windlass, ship's, J. W. Yewell.	434.054
Pu	mpine engines, means for operating, 3. #43,300 whiting neck, conductor's recording, A. W. Coffin. 434,143 (itting machine, D. H. Coles 43,230 diator sections, machine for boring and milling, O. Bryant. 444,079	hold	484,311
Had	liator sections, machine for boring and milling, O. Bryant	Wooden roller, J. W. Hyatt	434,185
Rai	tie D. Vanaman 434 365	Wrench, 8. F. Stever.	434,004 454,400
MAI		Wood cutting machine, YOU KIRK & KYRS. Works taind, J. V. Bocker. Wrench, S. F. Stever. Wrench, S. F. Stever. Wrench, S. F. Stever. Wrench tightener, J. W. Bess. Wringer. Bee Clothes wringer. Write pin, J. Barthel.	494.000
Rai	434,000, 434,147, 434,375, 434,389 to 434,391	Wrist pin, J. Barthel	536,200
Rai	lway switch, J. A. Duggan	DESIGNS.	
Rai	lway transit, aerial, W. L. Hight	Cane or umbrella handle, A. Rosenstein	20,006
Rai	lways, gripper for traction rope, G. Whittaker 484,140 age boiler, V. Wilhelm	Clasp or buckle for belts or sames, A. W. Patch- ing. Flags, banners, etc., ornamentation of, W. B. Washburn	20,094
Res	or, safety, H. B. Leach	Flags, banners, etc., ornamentation of, W. R. Washburn. Hammock stretcher, J. B. Patterson.	20,097
Rec	per mechanism. W. Lottridge	Hinge, G. S. Barkentin.	20.082
Rec	di. See Rod reel.	House, exterior of a. C. M. Dissosway	20.028
Ref	rigerator trap, C. H. Leonard	Hammock stretcher, J. B. Patterson. Hinge, G. S. Barkentin. House, exterior of a. W. K. Benedict. 20,685 to House, exterior of a. C. M. Dissoeway. House, exterior of a. A. Lacroix, Jr. 20,687 to House, exterior of a. A. B. Morison. 20,691 to Lock case, R. W. E. Christosen. Shipping and exhibiting case, A. L. Dyko. Stove plate, W. W. Noble. Table cloths etc. P. S. Pinkus. Tower, T. Beichard Toy savings bank, J. F. Lockwood. Type, font of printing, C. H. Beeler, Jr.	20.083
Rei	n grip. B. L. Smith	Shipping and exhibiting case, A. L. Dyke	20,104 20,100
Riv	et setting machines, receiver for, J. L. Thomp- ion	Table cloths, etc., F. S. Pinkus Tower, T. Reichard	20,101 20,095
Rol	reel, C. R. Matteson	Type, font of printing, C. H. Besler, Jr	20,086
Rol	et setting machines, receiver for, J. L. Thomp- 100		
Ros	ting machine, R. Kirk	TRADE MARKS.	10 205
Sad	die and carriage clips, die for making, Peck &	Boots, shoes, and slippers, Rice & Hutchins. 18,30s, Brandy, blackberry, Rheinatrons Bros. Canned meats, fish, fruits, and vegotables, J. W. Matthews & Co.	18,296
Sait	Branker, tr. Brenn	Matthews & Co	16,294
Sas!	1 fastener, C. D. Kelsey. 434,091 1 stop, L. B. Jordan 433,945	Matthews & Co. Cash Indicators, recorders, registers, and tills, American Cash Register Company. Corsets, H. F. Leprince. Dog farnishines, Medford Fancy Goods Company, Jeweiry and watches, R. R. Fores. Lacing hooks, shoe, W. H. Senidt & Co. Lacing hooks, shoe, which was a shoe with the control of the cont	18,280
Saw	Gling machine, T. Powell	Jewelry and watches, R. R. Fogel	18,293
BAW	guide, band, C. E. Wright. 434,010	Lard, Swift & Company.	18,307
Scal Scal	es, railway, Ballard & Fisher	Lard, refined hogs, G. Cassard & Son.	10,261
Sere	w machine, metal, E. Rothlisberger 434,204		
Sear	n compressing machine, G. W. & J. W. Crim. 434.322 ondary battery, G. W. Cochran	Lug straps, E. H. Jacobs Manufacturing Company Oil of bergamot, Dodge & Olonta.	18,208
Beer	ndary battery, P. Schoop	Oil of lemon, Dodge & Olcott	18,290
Seed	ters, etc., spring tooth for, J. P. Thramer 484,100	Smith & Parr Liquors, mait. Union Brewing Company Lug straps, E. H. Jacobs Manufacturing Company Oil of bergamot, Dodge & Olcott. Oil of Jemon, Dodge & Olcott. Oil of orange, Dodge & Olcott. Plance, Lindeman & Sons Plano Company. Plaster-of-paris, J. B. King & Co. Remedies for diseases of the throat and lungs, T. V. Sords.	18,300
Sem	ondary battery, H. Woodward 44,234 stripper, broom corn, H. Poole 44,004 lers, etc., spring tooth for, J. P. Thramer 48,100 ling machine, T. H. Nozon 484,292 sphore signal device, G. H. Johnson 484,984 rattor. New Contributal separator. Crain 484,084	Memedies for diseases of the throat and lungs, T.	18,368
Sept Sem	rator. See Centrifugai separator. Grain eparator. ing machine, H. Lefeber 433,346	Soap, hard, Velline Soap Manufacturing Company	1×.286
Bew Bew	ng machine, buttonhole, F. T. Leitlich 454,155	V. Sords. Remedy for certain named diseases, S. E. Boot Sonp, hard, Velline Soap Manufacturing Company Soap, laundry, McGiffert & Wands. Socks and stockings, seamless, Powell & Bro B.264.	18,285
lent	rator. See Centritugal separator. Grain eparator, ing machine, H. Lefeber	Type bars, machine for producing, Mergenthaier	10,000
1	Vheeler 433,971	Printing Company 1	16,397

	139
	Sewing machine thread feeding mechanism, E. B.
63	Welch
25	hole, F. W. Boberts. 494,118 Sewing machine thread tension releaser, N. Wheeler. 494,057
47 45 46 49	Sewing machine thread tension releasing device. E. M. Staples. 434,002
	Sewing machines, combined crimping wheel and turn-down folding attachment for, G. Boxley. 433,900 Shade appropri. W. F. Russell.
08 44 86 47	Shade support, W. F. Russell
100	Shank stiffener, G. H. Stevens
66 68 68	Shears, R. E. Gamble. Shears, K. Colech & Shafer. Shears, K. Colech & Shafer. Shears, K. Colech & Shafer. Shears, K. Shears, C. Shafer. Shears, K. Colech & Shafer. Shears, C. Shafer. Shingling bracket, Levi & Murchison. Shingling bracket, Levi & Sheymour. Showstand, R. T. Out.
_	Shoe nicking machine, O. E. Seymour
65 66 06	hole, F. W. Roberts Sewing machine thread tension releaser, N. Wheeler. Wheeler. E. M. Staples. E. M. Staples. Sewing machine thread tension releasing devices. E. M. Staples. Sewing machine thread tension releasing devices. E. M. Staples. Sewing machine, combined crimping wheel and assemble sewing machine, to the sewing machine, to the sewing machine, d. Staples Shade support, W. F. Russellent for, G. Boxley 454, 161 Shaft and wheel coupling, H. Unsicker 455, 165 Shank stiffener, G. H. Stevens. Shaping machine, J. M. Wright. Shaping machine, J. M. Wright. Shears, K. Gamble. Shears, K. Gomble. Shaft, J. Staples. Shears, Koelech & Shafer. 444, 163 Shears, Koelech & Shafer. 454, 165 Shoot nicking machine, O. B. Seymout. 454, 165 Shoot nicking machine, O. Sho
	Snow and ice flanger, W. McIntosh
56 76 75	W. Ostrom 44.081 Sole trimming machine, J. R. Scott 431,350 Spray diffuser, R. W. Mackenzie-Hughes 43,066
no	Spring. See Vehicle spring. Spring motor, J. Isele
59 53 91	Squeezer and strainer, combined, G. Gamien. 454,128 Stall, portable, J. W. Evers. 434,329 Stamp, time, J. D. Mallonee. 434,326 Stanchion, L. Alvord. 454,012
64	Stanchion, L. Alvord
64 83 87 10	stand. Work stand. Steam engine, D. E. Crosby
78	Steam engine, D. R. Crosby
71	Steam trap. D. L. Baroes. Steel, shaping coat. A. A. Potter
96 95 57	Stove, cooking, J. Black. 434,123 Stove or range, cooking, Bergstrom & Hansen 434,173 Stoves, cold and hot air five of W. Rube. 434,603
115	Street sweeper, H. E. Paine
61	Stude, etc., fastening device for, F. I. Sherman
91 68	man. 434,370 Sugar refining, L. Sternberg 434,074
38	stylographic mantolding, book for, J. L. Wort- man. 434,370 Sugar refining, L. Sternberg 444,774 Swinging gate, W. A. & H. F. Deema 444,075 Switch. See Electric directle switch. Railway Table. See Folding table. Ironing table.
33 31	Table. See Folding table. Ironing table.
96	Tank. See Jig tank. Target making machine, bird, F. C. Damm 484,107
107	Target trap, W. P. Brett
34	Thill coupling, A. Fultz
04 12 13	Thill coupling, S. D. Webb. 434,328 Thill support, J. R. Flautt. 434,369
63	Thrashing machines, conveyer attachment for, C.J. Hartley
44	witch see selectic treats witch. Railway witch the see Folding table, Ironing table, Table. See Folding table, Ironing table, Table slide, extension, J. D. Heckman. 634,571 Tank. See Jig tank. Target making machine, bird, F. C. Damm. 644,677 Target trap, W. P. Brett. 444,077, 444,077 Telegraph, printing, T. M. Foote. 442,531 Telegraph, printing, T. M. Foote. 452,5381 Thill coupling, Genery & Jones. 454,538 Thill coupling, Genery & Jones. 454,538 Thill support, J. R. Flautt. 454,269 Thrashing machines, conveyer attachment for. C. J. Hartley. 634,538 Thill support and the second seed of the seed of th
35 70 61	Tooth, artificial, E. A. Bryant 434, 417 Torpedo, C. Nelson 434, 291
74	Toured, C. Nelson 484,291 Tor pend, C. Nelson 4850uthward 444,37 Traction engine, J. B. Harris. 484,181 Transplanter, P. O'Meara. Transplanter, P. O'Meara. Transways, coupling apparatus for clovated wire 7 rope, A. Bleichert. Trans. See Refragerator trap. Steam trap. Tar-
99	Transways, coupling apparatus for elevated wire rope, A. Bleichert. 483,974
87 06 111 172 137 168 168	Trap. See Refrigerator trap. Steam trap. Target trap. Trough. See Rayes trough. Trough. See Rayes trough. Troucks stretcher, J. K. Garson. 434,126 Trucks, car, G. A. Aenchbacher. 434,256 Truck, car, G. A. Aenchbacher. Truck, car, G. A. Aenchbacher. Truck, car, G. A. & G. M. Brill. 483,356 Truck ratiway car, J. A. & G. M. Brill. 483,356 Truck cargaing machine, Hansen & Wain- Truck cowniow & Warner. 484,367 Tube corrugating machine, Hansen & 443,767 Tube expander, P. H. Bensde. 454,767 Typewriting machines, copy holder for, Pipes & 454,767 Pernot. 454,366 Umbreila holder, F. W. Strong. 454,366
72	Trucks, bolster guide plate for car, E. W. Grieves 434,386
77 R3	Truck, car, G. A. Aenchbacher. 654.125 Truck, railway car, J. A. & G. M. Brill. 433.23 Truck, Rrownjow & Warner. 434.346
142	Tube corrugating machine, Hansen & Wain- wright 484.000
18 06 79	Tube expander, P. H. Benade
185 147	Pernot 454,366 Umbrella holder, F. W. Strong 434,304
67 01 44 56	Valve for engines, slide, O. L. Ward
d/A	Valve, steam-actuated, Grabner & Ruperti
96 81 65 88	Vault or cell for outhouses, T. W. Carrico
46 90	Vehicle running gear, J. H. & J. F. Lueth
63 88 84	Vehicle wheel, P. Gendron. 434,146 Velocipede, J. F. Rauhut 438,962
29	Velocipede wheel, A. Carpentier 434,127 Vending machine, F. G. Dieterich 434,127 Viag. banch, L. Armstrong 432,073
19 06 03	Wagon brake, J. W. Avis 434,036 Wagon brake, J. R. Wade 434,027
61.	Wagon body, Z. F. Jones. 444,342 Wagon, road, C. W. Saladee 434,200, 434,200, 434,000
51 60 67 73 45	Wagon seat standard, B. Peacock 474,156 Wash stand splasher holder, L. Smith 484,053
73 45 93	Typewriting machines, copy holder for, Pipes & 44, 364 Pernot. Umbrella holder, F. W. Strong. 444, 304 Valve for engines, silde, O. I. Ward. 434, 367 Vaive, reversing, A. L. Engelbach. 434, 368 Valve, steam-actuated, G. S. Fauliner. 434, 369 Valve, steam-actuated, G. S. Fauliner. 434, 369 Valve, steam-actuated, Grabner & Eupertl. 434, 359 Varnish, W. D. Field. Vault or cell for outhouses, T. W. Carrico. 432, 369 Valve, steam-actuated, Grabner & Eupertl. 434, 359 Varnish, W. D. Field. B. M. Hunter. 435, 438 Vehicle power gearing, E. A. Sperry. 434,567, 451, 368 Vehicle power gearing, E. A. Sperry. 434,567, 451, 368 Vehicle spring, I. I. Blakeslee. 44, 229 Vehicle spring, I. I. Blakeslee. 44, 229 Vehicle wheel, P. Gendron. 434, 469 Velocipede, J. F. Rauhut. 453, 872 Velocipede wheel, A. Carpentier. 434, 561, 472 Vise, bench. L. Armstrong. 451, 372 Vise, bench. L. Armstrong. 451, 372 Wagon brake, J. W. Avis. 444, 562 Wagon seat standard, B. Peacock. 444, 562 Wagon seat riser, Handy & Sherman. 444, 563 Wagon seat riser, Ha
57 68	Water closet coupling, J. J. Ricketts
12	Water closers, etc., flushing device for, W. 624,020 Water closers, seat connection for, W. 800tt. 453,036 Water closers, esset connection for, W. 800tt. 454,030 Water wheel, D. A. Van & leek Water wheel, D. A. Van & leek Welding metals by electricity, H. & Fowler. 454,031 Wheel. See Car wheel. Vehicle wheel. Velocipede wheel. Water wheel. Wind wheel. 454,031 Windlass, ship's, J. W. Yewell. 454,034 Wird brakes, ship's, J. W. Yewell. 454,034 Wire brakes, machine for making, L. J. Ader-hold. 484,311
50 59 60	Water wheel governor, T. H. Coulter 484,88 Welding metals by electricity, H. E. Fowler 434,181
ю	Wheel. See Car wheel. Vehicle wheel. Velocipede wheel. Water wheel. Wind wheel.
6	Windlass, ship's, J. W. Yewell
3	Wood cutting machine, Von Kink & Kries 434,112
97	Work stand, J. V. Becker
6	Wooden roller, J. W. Hyatt. 484,195 Work stand, J. V. Becker 481,237 Wrench, S. F. Stever 484,009 Wrench, Sutton & De Voe 484,409 Wrench tightener, J. W. Bees 435,928 Wringer. See Clothes wringer. Mop wringer. Wrist pin, J. Bartbel. 434,200
8	Wringer. See Clothes wringer. Mop wringer. Wrist pin, J. Barthel
5	DESIGNS.
8 1 6	Cane or umbrella handle, A. Rosenstein
5	Flore bannons etc. ownermentation of W D
5	Flags banners etc. ornamentation of W. R.
8	Hinge, G. S. Barkentin. 29,082 House, exterior of a. W. K. Benedict. 20,083 to 20,085
3	House, exterior of a. A. Lacroix, Jr
	Lock case, R. W. E. Christesen. 20,009 Shipping and exhibiting case, A. L. Dyke. 20,104
1	Table cloths, etc., F. S. Pinkus 20,100 Tower, T. Beichard 20,005
	Waghburn Hammook stretcher, J. R. Patterson. 20,107 Hinge, G. S. Barkentin. 29,682 House, exterior of a. W. K. Benedick. 20,085 to 20,085 House, exterior of a. A. Lacroix, Jr. 20,087 to 20,085 House, exterior of a. A. Lacroix, Jr. 20,087 to 20,080 House, exterior of a. A. Lacroix, Jr. 20,087 to 20,080 House, exterior of a. A. B. Morison. 20,091 to 20,080 House, exterior of a. A. B. Morison. 20,091 to 20,080 Slopping and exhibiting case, A. L. Dyke. 20,106 Slove plate, W. W. Soble. 20,106 Table of T. Reichard. 20,096 Type, font of printing, C. H. Besler, Jr. 20,086 Type, font of printing, C. H. Besler, Jr. 20,106
1	TRADE MARKS. Boots, shoes, and slippers, Rice & Hutchins18,306, 18,305
1	Boots, shoes, and slippers, Rice & Hutchins18,301, 18,305 Brandy, blackberry, Rheinatrom Bros 18,306 Canned meats, 58b, fruits, and vegotables, J. W. Matthews & Co. 18,294 Cash, tedistors, recorders, resistants, and 1111s.
	Cash indicators, recorders, registers, and tills, American Cash Register Company
-	Dog furnishings, Medford Fancy Goods Company, 18,301 Jewelry and watches, R. R. Fogel
	Lacing hooks, abos, W. H. Smidt & Co. 18,306 Lard, Swift & Company
	Laru, flog, G. Cassard & Son
1	Smith & Parr
	Lug straps, E. H. Jacobs Manufacturing Company 18,308 Oil of bergamot, Dodge & Olcott
	Di of orange, Dodge & Olcott
	Cannod meats, 8sb, fruits, and vegetables, J. W. Matthews & Co. Cash indicators, recorders, registers, and tills. American Cash Register Company. American Cash Register Grompany. B. 289 Corsets, H. P. F. Leprince. Dog furnishings, Medford Fancy Goods Company. B. 281 Leweiry and watches, R. R. Fogel. Leading hooks, shoo. W. H. Senidt & Co. B. 282 Lard, Swift & Company. Lard, hog, G. Cassard & Son. Lard, hog, G. Cassard & Son. Lard, hog, G. Cassard & Son. Liniment for external vreatment of rheumatism. Senith & Parr. Liquors, mait. Union Brewing Company. B. 282 Lug straps, E. H. Jacobs Manufacturing Company. B. 283 Lug straps, E. H. Jacobs Manufacturing Company. B. 284 Lug straps, E. H. Jacobs Manufacturing Company. B. 285 Lug straps, E. H. Jacobs Manufacturing Company. B. 286 Lug straps, E. H. Jacobs Manufacturing Company. B. 286 Lug straps, E. H. Jacobs Manufacturing Company. B. 287 B. 288 Romedies for diseases of the throat and lungs, Tr. B. 286 Remedies for diseases of the throat and lungs, Tr. B. 286 Remedies for diseases of the throat and lungs, Tr. B. 286 E. 286
11:	tenedy for contain names diseased, S. S. Moot., 10.000
1.	10 904 10 905
29	Type bars, machine for producing, Mergenthaier
	Printing Company

140	
ALPHABETICAL LIST OF INVESTIG	NS !
FOR WHICH PATENTS WERE ISSUE ON THE 19TH DAY OF AUGUST, 18	KD ,
	1.5
Air cegine, A. Brock. 658 Air flue gate, H. B. Dewey. sk. Aiarus. See Door aiarus. Heet aiarus. Aniusal trap. H. C. Anderson. 658 Aniusal trap. H. Ede et el. 658 Ankie joint, H. C. Wintermute. 658 Arm reat and table, portable, J. M. Fiels. 658 Azie box, carriage. T. F. N. Finch. 658 Azie box, carriage. T. F. N. Finch. 658 Azie box, carriage. 659	751 I
Animal trap. R. Eads et al	,618 ,518 ,509
A nie bon, carriage, T. F. N. Finch 431 Naby chair and walker, combined, O. Jacob 434	.834 1 ,713 1
Rag holder and truck, J. H. Reckord 458 Bake pan, W. L. Veley 484 Rallag press, Brown & Gebri 454,700 to 484	.500 I .503 I
Arm rest and table, portages, J. Pion. est. Axis box, carriages, T. F. N. Finch. 431 Haby chair and walker, combined, O. Jacob. 435 Hosh chair and walker, combined, of Jacob. 436 Hosh chair press, Erown & Gehri. 444,789 to 434 Ealing press, Erown & Gehri. 444,789 to 434 Ealing press, A. A. Gehri. 454,789 to 434 Ealing press, A. A. Gehri. 454 Ealing press, A. A. Gehri. 455 Ealing press, A. Gehri. 455 Eal	.061
Banjo attnehment, D. Veiteb	,000
Hath. See Blotter bath. Batteries apparatus for transferring electric car. #4.279 to 494.281, 494.	963
Harrel washing machine, W. J. McLood. Bath. See Hiotter bath. Batteries apparatus for transferring siseries our, F. G. Curning. Batteries. See Holter for transferring siseries car. F. G. Curning. For transferring siseries car. F. G. Curning. The transferring siseries Mattery. Battery. Secondary bat- Lory. Thormal battery. Thermo-electric bat- Lory.	Se2 1
tery. Thermal battery. Thermo-electric bat- bery.	010 H
Rattery plate, secondary, W. B. Hollingsbead	ASS P
Bester, L. B. Groug. 484, Bed bottom, spring, J. P. Laggett 484.	THA F
Bedstead, portable, F. H. B. Babbe 404, Belt and appliances, electric, R. E. Williams 464.	550 F 746 F 636 G
Blader, temporary, J. H. Stewart	717 6 811 G 880 G
Blocker bath, F. M. Pricelley & Benter	560 G
Benter, L. B. Green: Gl. Gr. to 654,677, 654,678 to 654. Bed bottom, prring, J. P. Lengerti. Bed bottom, prring, J. P. Lengerti. Gl. Bed bottom, G. W. Bederan. Gl. Bedstand, folding G. W. Bederan. Gl. Bedstand, nortable, F. H. B. Babbe. Bet and appliances, electric, R. B. Williams. Gl. Bett and appliances, electric, R. B. Williams. Gl. Bitter, V. Lofton. Bitter, T. W. Lofton. Bitter, temporary, J. H. Bizwart. Gl. Bitter, temporary, J. H. Bizwart. Gl. Bitter, temporary, J. H. Bizwart. Gl. Bitter, Death, F. M. Priotier, Electer. Seath, F. M. Priotier, Electer. See Etemborler. Wash boiler. Boilers. connecting box for water tabe, C. A. Knight.	001 G
Knight See Lock bolt. Lock or latch bolt. Bolt. See Lock bolt. Lock or latch bolt. Bolt cutter, rotary shear stay, E. Hay	5007 G
Book and Index, cymbined, H. M. Risby	724 G
Boot and taily sheer, poll, H. M. Geiger	702
Hooks and Lally sheer, poll, H. M. Leeger. 404. Boot lack, L. Bommer E. Heyer 484. Boot lack, L. Bommer E. Heyer 484. Boot see Angle four Ballot box. Conflact box. Box C. A. Worsdor box.	G
Box, C. A. Worsley 434. Box making machine, F. Lundgree 434. Box making machine, K. Rechter 444. Bracket. Sue Curtain bracket. Curtain roller	545 G 545 G 806 G
Brake. See Spread brake. Vehicle brake. Wagon	1-
brake. Bran pecking mechine, S. T. Lockwood. Bridles, gwercheek bit for, L. T. Crabb. 484. Broom hanger, R. D. Markham. 484. Broom holder, H. C. Beckmann. 484. Buchet, mitt, E. Burrows. 484. Buchet, J. Meeman. 484. Buchte, J. Meeman. 484. Buchte, J. Meeman. 484.	100 G
Broom hanger, R. D. Markham. 634, Broom haider, H. C. Beckmann. 684, Bucket, mith, E. Burrows. 484,	903 H 319 H 428 H
Buckle, D. Mormon Bluggy boot, J. K. Lovee. Burner. See Gas burner. Hydrocarbon burner. Vance burner.	700 666 H 670 H
Burner, See Gas burner, Hydrocarbon burner, Vapor burner, Butter mould, ti. Titne	H H
Button, ceff or collar, S. Tonnaire. 434.5 Button, separable, C. E. Perry. 444.5 Button etrip blanks, making, H. W. Lyon. 434.5	983 H 902 H 946 H
Vapor burner. Ntapor nould, 41. Titus Button, cuff or collar, 5. Tunnaire. 434, Button, seem or collar, 5. Tunnaire. 434, Button, seem of collar, 5. Tunnaire. 434, Button strip blanks, making, H. W. Lyon. 434, Cable gripper and menon for carrying the same over drussing cables, J. S. Morris. 434, Cale manchin . J. E. Mitchell. 434, Cale manchin . J. E. Mitchell. 434, Camera. See Photographic camers. 434, Can can J. G. Hodgeon. 434, Can can J. G. Hodgeon. 434,	57.4 94 904 H
Camera. See Photographic camera. Cae cap, J. G. Hodgson. 494,	62 H 68 H
Can cap, J. G. Hodgeon. 644,8 Can opener, R. W. Newton. 684,0 Can opener, R. E. Wood. 644,0 Can opener, R. E. Wood. 644,0 Can opener, R. E. Wood. 644,0	19 H
Care Book, R. B. Hamilton Car and device for operating automatic railway switches, B. C. Rowell Car strachment, G. Envirobery 444.9	BB H
Car coupling, R. S. Berry	56 H
Car coupling, P. Brown. 484.7 Car ocapitog, B. N. Olfford 484.5 Car, dusaping J. K. Lockard 484.5 Car, railway, R. H. Beckley 684.	465 H
Care, closing device for the doors of railway, E. O. Lembrock. 434,5 Care, trolley for electrically propelled, Stevens &	16 H
Wessert 614. Carriage convertible, J. F. Goodrich 684. Carriage seats, cashion roll for, R. K. James 644.	982 H
Carriage too prop. J. V. Patlea 484,4 Case. See Map case.	155 H
Cash register and indicator, S. P. Watt	107 H
Coment time, feeding, W. Juy	
volving chair. Chair, C. A. Lee	Jo
Chenck drill, C. T. Pract. 434. Clamrette machine, E. Hardie (r). 11.1 Clamp. See Weiding clamp.	OI K
Clothes pin, P. M. Ackerman	43 K
Clamp, A. T. Treft \$4.6	III Ea
Comb. Sas Curry comb.	67 La
Condenser and water heater, steem, F. Rade-mather 644 Contact box. F. A. Wessel 6843	163 La
Convertible chair, J. G. Googme. 634,3 Cooler, oyster, A. J. Doty 684,8 Cooling board, W. A. Griffith. 486,4	92 L4
Cooling device, Fayod & Mesteru 884.0 Corn busking machine, R. Brennan 84.4 Corrugating machine, E. Gothberg 84.0 Corest protector, A. Lestham 64.6 Coresta, searning botton strips to, H. W. Lyon, 65.4	008 La 154 La 164 La
Corset protector, A. Lestham. 484.6 Corsets, securing button strips to, H. W. Lyos. 484.5 Cotton chopper, Casey & Morgan. 484.7 Cotton gin, G. F. Brott. 484.7	108 L47 L47 L47
Cover holder, E. W. Stone 414 S	50
Crushing and pulverising machine, W. H. How-	10 Id
Cultivator, B. F. Zell	100 36
Curtain bracket, R. R. House 44.0 Curtain roller bracket, J. E. Juesemann 434.7	14 M
Cetter. See Bolt cutter. Paper cutter. Stalk cutter. Cutter bar guide, Robinson & Collins	(B) M
Bentar engine hand pieces, attachment for, A.	71 M
Browne	PT M
Dentist's mixing slab, L. Tual 414.7 Dice chaker, L. J. Turner 614 6 Dies or articles, ornamenting circular, F. Ecau-	34
Duor alarm, W. F. Lutz, Jr	76 No
Door Banger, W. Barry	85 No
Drawing board, J. T. Warden	
ment for, C. W. Roeves	m Or
Drying apparatus, J. Blumer	52 Or
Dye, bloc, A. Weichers 434.4 Dyeing upparaton, Ducros & Tymeson 434.8 Bar and bull, F. Z. Hicks 488.8 Elsetric conductor, W. A. Phillips 434.8 Elsetric conductor, T. A. Editor 434.5	64 Pa
Hectric conductor, W. A. Frannya. Electric generator, T. A. Edison. 645 Electric lighting, lower for, D. Maxwell 685 Electric machine, dynamo, J. B. Ents. 645 Electric mater, J. Candersy 665	on life.
Electric mutor, mutipus circuit, C. J. van De-	00 Pa
poete. 494,5 Bienzie power transmission, E. Thomson. 454,4 Elenzie power transmission, E. Thomson. 454,6 Elenzie posh button, P. Hathaway. 434,5	16 Pr 80 Pr 8× Pr 66 Pr

Scientific	8
Electrical distribution, system of, H. E. Wajter 6's.fil	4 E
Heerrical distribution, system of, R. E. Water. Bliestrode for basistres and the method of making the same, D. Pepper, dr. 454, 462 and dr. 454 and dr	4 PPP
Rievator asfety device, R. F. Mounting Ga.d.	8 220
Stephen. Bigine. See Air engine. Gas and hydrocartson engine. Pumping engine. Steam engine. Engines, dash pot for steam, J. T. Lindstrom	110
Englines, dam pot for steam, 3. T. Lamastone. Envelope biank gamming machine, I. W. Hues- [10] (44.7) Ernser, R. Leelie (44.7) Ernser, A. F. G. Danielis (45.5)	1 10
Section Sect	66 T 80
Eraser, A. F. G. Daniels Evaporating apparatus, T. Gaust. 68, 68 Exercising machine, D. L. Dowd. 64, 78 Exercising machine, W. E. Forest. 68, 61 Extractor. 80, 10, 10, 10, 10, 10, 10, 10, 10, 10, 1	PPPP
Peed water boater and purifier, C. E. Porreira. 484.36 Foodwater hoater and purifier. A. Krumholi. 484.46 Foodwater regulator. E. J. Hoffman. 484.56 Foodmater roughts. 484.56 Foodmat. 484.56 File binder, M. M. Coppenis. 484.56 File binder, M. M. Coppenis. 484.56 File binder, M. M. Coppenis. 484.56 Files. apparatus for routting, C. C. Peters 484.58	PP
Fence post, J. W. McCosi	222
Filter, W. H. Bargent 484,578 454,578 Vilter press, F. E. Iseemann	Pi
Fighing rods, roes fastener for, J. G. Landman \$43,78 Fishing, tip-up for, C. T. Costellow \$43,48 Flexible tabe, T. H. Almond \$65,74 Furnace. See Hearth furnace. Ore reasting fur-	
Back	Pi
Gauge bracket, R. H. Greene. 684,70 Galvanite battery, W. M. Fink. 684,80 Game, C. W. Muns. 684,60 Game apparatus, S. S. Peters 484,72	i B
Game, C. W. Muns	Ra
band. Jan. appearatus for manufacturing, J. B. Archer. 434.00 Jan. appearatus for manufacturing, J. B. Archer. 434.00 Jan. barrett & Daly. 484.00 Jan. See Air Suc gate. Baliway gate. Swing-	C I BEW
Gate. See Air See gate. Hallway gate. Swing- ing and sliding gate. Sate 2. Twedell. 344.99 Jate. G. W. Waiters. 484.99 Jenerator. See Seeting generator. Thermo- electric generator.	Ra
Goog, alarm, A. E. Briggs	R
electric generalize,	Ra
Grinding mill, roller, T. W. Graham	Re
an sight, O. A. Horser 43.45 an sight, O. A. Horser 43.75 an, spring air, C. H. Cleacent 63.85 an vaive, presunate B. J. Gatling 63.65 Lame fastener, J. Beeler 43.65 Lame fastener, F. R. Bostwick 43.65 Lamener, F. L. Bostwick 43.67 Landla. See Saw handle. Landla. See Saw handle. Tor hanger, From langer, Door hanger, Mir- Tor hanger.	Ri Ri Re
Inamera, mallets, or other striking tools, handle for, J. W. Baton. 404,773 Handle. See Saw handle.	
Iarness, E. K. Blaikin 434.421	Sa Sa
larvester, grain binding, L. Miller. \$15.612 farvester, grain binding, W. F. Olin. \$45.502 farvester, grain pistform, L. Miller. \$15.602 lat brim curling machine, J. Fitz et al. \$15.602 lat brim curling machine, J. Fitz et al. \$15.602 lat av carrier slavating puller. W. Londen. \$18.502	Sa Sa
Hearth furnace for metallurgical operations, B. C. Lauth 444,715 Loute 1 644,715 Louter See Foodwater heater. 664,872	Ser Ser Ser
lides, treating, J. Schmitt	Ser
Müller John W. C. Conway 494.00 Loisting apparation, W. C. Conway 494.70 loisting mechanism J. H. Montgomer 494.90 loider. See Bag holder. Broom holder. Cover halder. Paper holder. Pen holder, Pillow sham holder. Seek holder. Shoe holder wham holder. Seek holder.	Sh
holder, Paper holder, Pen holder, Pillow sham holder, Sack holder, Shoe holder, Corey extractor, A. H. Seaman,	80
Lorenshop blanks, roll for preparing W. V. Purdy 404 638	Bp
Hub bands, machine for applying rings to, T. J. Kirid	Spi Sp
Hydrocarbon burner, E. Rogers	Sta Sta
rrigator and fertiliser, subsoil, J. H. L. Tuck 4:4.814 lack. See Boot jack. Lifting jack. law trap. P. H. Bowash	Sta
(eg and barrel washing machine, J. J. Danks	Ste
Litchen, portable, L. Maien	Str.
adder, B. Baber 444,402 adder, folding step, L. Kopf 472,788 antern, A. C. Stout 446,664 ast. L. Quigz 484,675	Str
atch, E. Sonedecker	Sw Ta
Josephing apparatus, A. F. Rockwall 434.718	Ta Te
Afting teck, M. P. Holmes 634.712 Ane puller, C. N. Wilcox 644.06 Link detachable, N. Boungann 64.406 Loading and unloading mechanism, N. E. Green 634.06 Ack. See Nut Lock.	Te Th Th
ock bolt, H. E. Russell, Jr	Th
com shuttle operating mechanism, J. A. Tucker 481.528 cotton, F. Schmidt. 481.528 cotton, F. Schmidt. 481.528 cotton as a cotton of the cotton	To To
tap case, I. W. Heuderson	To
dechanical motor, W. H. Hunter	Tre
for forming and welding, E. Thomson	Tre Tu
ser. dirl. See Grinding mill. Saw mill. dirror hanger for bureaus, etc., J. R. Anderson., 434,522 dirror support, adjustable, R. P. Millots	Tu Tu Va
fould drying apparatus, P. McArthur. 434,833 dortar, composition of matter for, M. Furiey et al. 434,630 dotor. See Klectric motor. Mechanical motor. fower, lawn, F. M. Hunt. 434,787	Va Va Va
Cower, lawe, F. M. Hunt. \$44,787 Inpkin and towel supporter, A. J. Adamson. 434,537 (ocktie fastener, J. B. Pundergast. 434,698 (ocale, spraying, E. Morts. 434,518	Val Val Ve Vo
tot lock, W. Welis 494,574 11. extracting, C. F. Binder 634,696 63	Vel
bury re roasing furnace, 8. Triviet. 44,665 res eparator, magnetis, Edison & Dickson	Vel Vel Vel
Chick to consideration and account to the total total to the contract t	Via Vol Wa
acking, rod, W. H. Richmond	Wa Wa Wa Wa
ree with heated gases, reducing iron, C. Adams. 634,98 veen, F. W. Bergmann 494,577 veking, rod, W. B. Richmond 494,577 veking, rod, W. E. Richmond 494,787 veking, rod, F. F. Swain. 494,786 veking, rod, F. F. Swain. 494,786 veking for the control of the control	Wa
aper bag machine, W. B. Purvis	Wa

American.	[August 30, 189
Paper feeding machine, W. Womersley. Paper holder, J. F. Frankey. Paper holder, J. F. Frankey. R. J. S.	Wire device for emporting shells in the manu- facture of seamless plated, H. T. Smith.
Cab.	TRADE MARKS. Antibacterials, aseptics, antiseptics, and antisymotics, E. Merck. Baskets, G. Gorton. Bitters, R. Lassig Co. Boilers, compounds for removing scale from, C. H. Blake. Orgars, P. R. Rose & Co. Cornets, Alikin, Son & Co. Hair restorative, M. M. Snyder & Co. Hot air, aleans, and hot water heaters, S. S. Knives, scissors, shears, and rasrs, Hibbard, et al. Leather, Binishing, D. H. Cullins. Liniment, L. Conrad. Mineral water, Nes-čka-Ra Mineral Spring Cum-
Press. See Balling press. Filter press. Printing Press drill, W. H. B. Craggs. Printing machines, broosing attachment for, F. M. Mole. Propeller machines, broosing attachment for, F. M. Mole. Propeller, buoyant, G. H. Fond. Propeller, buoyant, G. H. Fond. Propeller, bart and mechanism for driving the name, F. W. Pool Protector. See Corset protector. Pruning implement, C. Hamans. G. G	pany. Needles, S. Beinsel Sci. et al. Paper, writing, Holyoke Paper Company. Perfumery, toilet waters, cons, astchet powders, and smelling saits, Ladd & Coffin. Sold States of the Coffin of the
Sail Joint, G. A. Christ Sailway, electric, R. M. Hunter. Sailway for, Racchford & Evans. Sailway switch, street, B. Bormann. Sailway switch, street, J. H. Williams. Sailway switch, street, J. H. Williams. Sailway switch, street, J. H. Williams. Sailway street, Sailway Sailway Sailway te Sailway	A printed copy of the specification and draw any patents in the foregoing list will be furnished this office for \$\overline{E}\$ canta. In ordering piease state name and number of the patent desired, and rem Munn & Co., \$\overline{E}\$ Rroadway, New York. Canadian Patents may now be obtained by inventors for any of the inventions named in the going list, provided they are simple, at a cost of each. If complicated the cost will be a little more, full instructions address Munn & Co., \$\overline{E}\$ Broadway. New York. Clier foreign patents may also be obtained by the complex of the compl
Revolving chair, C. C. Trapp	Inside Page, each insertion 75 cents a lack Page, each insertion \$1.00 a lin. The above are charges per agate line—about words per line. This notice shows the width of the and is set in agate type. Engravings may head a tasements at the same rate per same line, by mea ment, as the letter press. Advertisements murcocived at publication office as early as Thursday n ing to appear in next issue.
Section Sect	R Is Hard, Dense, and hesive. Does not cheek or
evering machine, A. O. Very. bastin, device for securing rings or annular pieces on, G. F. Simonds. pieces on, G. F. Simonds. 34, 473 historian pieces of the securing rings of annular states ignaling device, portable electric, F. Pearson. 44, 493 historian, Regan & Neuert. 44, 995 historian, Regan & Neuert. 44, 995 peaking the E. F. Meesleb, 44, 472 peaking the E. F. Meesleb, 44, 472 peaking the pieces of the pie	Patent Foot Power Machinery Complete Outfits. Wood or Metal workers without steam power, can successfully compete with the large shope, by using our New LABOR SAVING Machinery, latest and most improved for practical shop use, also for industrial Schools, tlome Training, etc. Caralogue free. Seneca Falls Mfg. Co. aw Water Street, Seneca Falls, N. Y.
printing woo, separable spanule for, u. Balley, set, or pread brake, i. F. Lawrence	LUMINOUS FOUNTAINS.—A J falled description of the structure and mode of or often of the tuninous contains at the Paris expose of 1896. With 6 illustrations. Contained in SCHENT AMERICAN SUPPLEASINY, NO. 727. Price 10 or To be had at this office and from all newsdealers. SEBASTIAN, MAY & CO'S Improved Screw Cutting
topper. See Bottle stopper. tove lid and center piece and lifter therefor, P. Wilhelm	Power LATHES Power LATHES Power LATHES Dogs, and machinists' and amateurs' outfits. Lather on trial. Catalogues mailed on application. 165 W. 2d St., Cincinnati, O. ALUMINUM.—DESCRIPTION OF T.
Thermo electric battery, H. B. Cox	method of manufacturing this metal from cryolit practiced at chilance Aluminum Works at Walts With 8 figures Contained in SCIENTIFIC AMERICAN SCIPLERINE, NO. 731. Price 10 cents. To be his bid office and from all newscheslers. EDISON LAMP For Batteries or Dynamos.
10. See Kallway tle.	We will send free, Catalogue E which gives prices and description lamps, together with directions How to Make a Chenp Battery to operate them EDISON LAMP CO., HAMRISON, A
apor burner, D. T. Eirkpatrick. 431,781 ehicle bruise. M. P. Peterson. 434,455 ehicles, compensating and steering gear for road, C. P. Brown. 434,554 ehicles, propelling mechanism for electric, T. A. Edison. electpede, T. V. Jeffery. 434,449 electpede, C. G. Molin. 434,566 electpede, G. G. Molin. 434,615 electpede, G. T. Warwick. 434,615 ending apparatus, J. B. Moos. 434,615	The value of the SCIENTIFIC AMBRICAN as an ad- tising medium cannot be overestimated. Its circula is many times greater than that of any similar jou now published. It goes into all the States and Ter- rice, and is read in all the principal libraries and rea- rooms of the world. A business man wants somet- more than to see his advertisement in a princed- structure of the state of the state of the advertises in the companies of the state of the electrical in the companies of the state of the some other paper for the SCIENTIFIC AMERICAN, we selecting a list of publications in watch you decide for your interest to advertise. This is frequently d
the state of the s	for your interest to advertise. This is frequently of or the reason tast tice sarent gets a larger commission the papers having a small circulation than is all ed on the SCHENTIFIC AMBRICAN. For rates see top of first column of this page, or dress MUNN & Cit. Publishers. 361 Brendway. New Yer PEFFECTLY UNIFORM SPEE No matter how Changeable the Power may

ł	Welding clamp, electric, H. Lemp	434,50
1	Weiding, electric, E. Robb	474.40
١	Welding, electric, K. Thomson.	ATEN CO.
1	Whips to their suckets, locking, J. McGes.	474 51
1	Window washer, K. A. Hauffer	484.72
	Wire coating apparatus, C. Q. Goodwin	434,BI
	Wire, device for supporting shells in the manu-	-
	facture of seamless plated, H. T. Smith	656.00
	Wire stretcher, J. Klopfenstein.	424,80
	Woodworking machine, W. E. Taft	454 0
	Wrench, See Pipe wrench,	****
	TRADE MARKS.	
ı	Antibacterials, aseptics, antiseptics, and anti-	
	symotics, E. Merck	10.33
	Bastets, G. Gorton	18,31
	Bitters, K. Lassig Co	18,2
	Boilers, compounds for removing scale from, C.	-
	H. Blake Cigars, F. R. Rice & Co.	18,31
	Cornets, Aitkin, Son & Co	16,31
	Hair restorative, M. M. Snrder & Co.	18.3
	Hot air, steam, and hot water heaters, 8, 8,	any of
	Jewett & Co	38.31
	Knives, scissors, shears, and randers, Hibbard, et al.	16,31
	Leather, finishing, D. M. Collins	18,31
	Liniment, L. Conrad Mineral water, Nee-Ska-Ra Mineral Spring Com-	18,32
	pany	18.33
	Needles, S. Beissel Sol., et al	18,35
	Paper, writing, Holyoke Paper Company	18.31
	Perfumery, toilet waters, soap, satchet powders.	anda.
	and smelling saits, Ladd & Coffin	18,31
	Soap in cakes, bars, and chips, C. Lipps	18,31
	Tobacco, cigars, and cigarettes, chewing and	**
	Smoking, A. W. Turner	18,32
	Tooth powder, F. A. Ewer	18,32
	Velvets, W. Openhym & Sons	18,33
	Watch cases, composition, Dueber Watch Case	s-of-em
	Manufacturing Company	18,33
	Whisky, Du Vivier & Co	18,73
	Wine, sherry, Williams & Humbert	18,32

Movertisements.

Inside Page, each insertion - - - 75 cents a line. Back Page, each insertion - - - \$1.00 a line. The above are charges per agate line—about eight words per line. This notice shows the width of the line, and is set in agate type. Engravings may head adversisements at the same rate per agate line, by measurement, as the letter press. Advertisements must be more approximately of the problem of the property of the problem of the prob



USE ADAMANT WALL PLASTER

It is Hard, Denne, and Adhesive. Does not check or crack, it is impervious to wind, water, and disease germs. It dries in a few hours. It can be applied in any kind of weather. It is in gen-ral use. Licenses granted for the mixing, using, and selling.

Address ADAMANT MFG. CO. 300 E. Genesee St., Syracuse, N. Y.

Patent Foot Power Machinery

LUMINOUS FOUNTAINS.—A DE-failed description of the structure and mode of opera-tion of the luminous fountains at the Faris exposition of 1888. With 6 literaturions. Contained in Scientific AMERICAN SCIPTICERENT, NO. 727, Price in Conta To be had at this office and from all newsdealers.

SEBASTIAN, MAY&CO'S

ALUMINUM.—DESCRIPTION OF THE nethod of manufacturing this metal from cryolite as which grained the chance Aluminum Works at wallend. While Egunes. Considered in SCIENTIFIC AMBRICAN DISCOURTS CAMBRICAN OF ST. Price 10 cents. To be had at his office and from all newsdealers.



EDISON LAMPS

For Batteries or Dynamos. % to 80 Candle Power. 3 to 40 Volts.
We will send free, Catalogue B,
which gives prices and description of
lamps, together with directions How to Make a Cheap Battery to operate them.

EDISON LAMP CO.,

TO BUSINESS MEN

ERFECTLY UNIFORM SPEED! No matter how Changeable the Power may be. Apply for information to T. M. FOOTE REGULATOR CO.,

Founded by Mathew Carey, 1785.

HENRY CAREY BAIRD & CO.
Industrial Publishers, Booksellers, and Imperiers.
S10 Walnut St., Philadelphia, Pa., U. S. A.
13 Our new and Revised Catalogue of Practical and
Scientific Books, 30 pages, 5vo, and our other Catalogues
and Circulars, the whole covering every branch of Science applied to the Arts, sent free and free of postage
to any one in any part of the world who will furnish his
address.

<u>ARCHITECTURAL</u> BOOKS.

Useful, Beautiful, and Cheap.

To any person about to erect a dwelling house or sta-ble, either in the country or city, or any builder wishing to examine the latest and best plans for a church, school house, club house, or any other public building of high or low cost, should procure a complete set of the ARCHI-

The information these volumes contain re work aimost indispensable to the architect and builder, and to persons about to build for themselves they will and the work suggestive and most useful. They so colored plates of the elevation, plan, and detail draw-ings of simost every class of building, with specifica-tion and approximate cost. Eight bound volumes are now ready and may be ob-

tained, by mail, direct from the publishers or from any newsdealer. Price, \$2.00 a volume. Sutched in paper covers. Subscription price, per annum, \$3.50. Address

MUNN & CO., Publishers, 361 Broadway, New York.

MANUFACTURERS

59th Grand National Industrial Exposition

American Institute of the City of New York

Will Open Oct. 1st and close Nov. 29, 1890. Intending exhibitors must make early application to secure proper space and classification. For blanks and other information address GENERAL SUPERINTENDENT proper space and classification. For blanks a nformation address GENERAL SUPERINTENDE can institute, 113 West 38th 8t., New York City.

SPYGLASSES, BINOCULAR AND ASTRONOMICAL

TELESCOPES

OPERA, MARINE AND -A FULL LINE OFTOURIST GLASSES. PHOTOGRAPHIC
BAROMETERS & APPARATUS INCLUDING
THERMOMETERS KODAKS & HAWKEYE.

JEND FOR OF THE CONTROL OF TH L. MANASE,
CATALOGUE. 88 MADISON ST CHICAGO ILL.

ICE-HOUSE AND REFRIGERATOR.
Directions and Dimensions for countraction, with one
flustration of cold house for preserving fruit from
season to season. The sir is kept dry and pure throughout the year at a temperature of from 24 to 27. Contained in SCIENTIFIC AMERICAN SUPPLEMENT NO. 116.
Price 10 cents. To be had at this office and of all news-



KEEP COOL!

Light - Running Ventilating Catalogue free.
GEO. P. CLARK,
Box I., Windsor Locks, Conn.
Jaz. Goldsmith, Agent, 744 B'way, New York.

Useful Books!

Manufacturers, Agriculturists, Chemists, Engineers, Meanofacturers. Agriculturists, Chemists. Engineers, Mechanics. Builders, men of leisure, and professional men, of all classes, need good books in the line of their respective callings. Our post office department rermits the transmission of books through the mails at very small cost. A comprehensive catalogue of useful books by different authors, on more than fifty different subjects, has recently been published for free circulation at the office of this paper. Subjects classified with names of author. Persons desiring a copy, have only to ask for it, and it will be mailed to them. Address,

MUNN & CO., 361 Breadway, New York.



CIRCULATION OF WATER IN STEAM Bollers.—A lecture by Geo. H. Rabbook, delivered in the Sibley College Course, discussing the advantages of circulation of water in steam boilers and the best seams of securing it under most efficient conditions. With 10 liustrations.

SUPPLEMENT, No. 74.5. Price 10 conta. To be had at this office and from all newsdealers.

ROUGH OR DRESSED SURFACES. Ransome's Method of Finishing Concrete Walls
County Rights 450 to 4500.

RANSOME & SMITH COMPANY,
230 Montgomery Street, San Francisco, Cal.

NEWSPAPER DERFECT



PERFORATED METALS MINING SCREENS COAL OF ORE SEPARATORS, REVOLVING OF SHAKING SCREENS JICS & STAMP BATTERIES OF MILLING MINING MACHINERY HARRINGTON & KING PERFORATING @ CHICAGO

MODELS and Experimental Work of Steel, Iron, LIGHT MACHINERY, Special Machinery, and Tool Brass, Rubber, etc., constructed to order. L. and Sanall Articles M'fd. Accurate work a specialty N. ERLANDSEN, 167 Rivington Street, New York.

SAFE BOILERS FOR AMATEUR WORK By G. D. Hiscox.—Description of several types of eafe steam generators for the use of amsteurs—the tiple coil boiler, the pipe boiler, pipe sectional boiler. With 3 illustrations. Contained in Scientific American Supplies and the contained of the C



DRY AIR REFRIGERATING MACHINE DR. I. ALE RESPECTATIONS MACHINE.

Description of Hall's improved horizontal dry air refrigiency designed to deliver about 10,000 cubic feet of cold air per hour, when running at a speed of 100 revolutions per minuse, and capable of reducing the temperature of 30 above to 30 below zero. With five figures, use of 30 above to 30 below zero. With five figures, see of 30 above to 30 below zero. With five figures of the first state of the first seed of the first

NVISIBLE HINGES suitable for all kinds of fine work. Send for samples and price list. INVISIBLE HINGE CO., 318 Chapel Street, New Haven, Conn.

VOLNEY W. MASON & CO., FRICTION PULLEYS CLUTCHES and ELEVATORS PROVIDENCE, R. I.



Barnes' Foot-Power Machinery Lumplete outfits for Actual Workshop
Business. A customer says: "Considering its capacity and the accuracy of
your No. 4 Lathe, I do not see how it
can be produced at such low cost. The
velocipede foot-power is simply elegant. I can turn steadily for a whole
day, and at night feel as little tired
as if I had been walking around."
Descriptive Price List Free.
W. F. & JOHN BARNES CO.,
1989 RUBY ST., Rockford, Ill.

POP SAFETY VALVE
WATER RELIEF VALVE
IMPROVED STEAM GAGE
STEAM ENGINE INDICATOR

Single Bell Chime Whistle, and all instruments used in connection with Steam, Ar and Water. Sole Agents for Clark's Lanen Fire Hose. CROSBY STEAM GAGE & VALVE CO. PB Giller St.

ELECTRO MOTOR. SIMPLE, HOW TO make. By G. M. Hopkins.—Description of a small electro motor devised and constructed with a view to assisting amateurs to make a motor which might be driven with advantage by a current derived from a battery, and which would have sufficient power to operate a foot lathe or any machine requiring not over one man power. "The I figures. Contained in SCIENTIFIC AMERICAN NO. 641. Price 10 cents. To be had at this office and from all newsdeslers.

Fay's Patent Spring Dividers

With new quick adjusting automated coloring spring nut.

Micrometer Calling a spring 1.25

PRICE LIST.

1.25

Spring 1

NAVE YOU an untried invention? Write, learn ments will benefit you.

J. H. JONES, 68 Church Street, Rockford, Illinois.



THE NEW NON-CONDUCTING MATERIAL is a Flexible Felt Made of Pure Asbestos, in a finely divided fibrous state, indestructible by heat and unexcelled as a Non-Conductor. U. S. Navy tests show it to be superior to Hair Felt in Non-Conducting qualities. Made into sectional form for pipes and into sheets and roils for large surfaces. Send for Samples. Asbestos Heiler Ceverings, Stemm Packings, Asbestos Cloth, Asbestos Building Paper, etc.

for pipes and the Coverings, Steam Pathings, Liberty St., New York. Building Paper, etc.
THE CHALMERS-SPENCE CO., 59 and 61 Liberty St., New York.



After being on the Market Five Years

of charge to any address.
MUNN & CO., 361 Broadway, New York.

THE PHONOGRAPH.—A DETAILED description of the new and improved form of the phonograph just brought out by Edison. With 8 engravings. Contained in Scientifich American Suppliement, No. 632. Price 10 cents. To be had at this office and from all newsdesiors.

TYPEWRITERS.

Largest like establishment in the world. First-class Second-hand instruments at half new prices, Unprejudiced advice given on all makes. Ma-chines sold on monthly payments. Any instru-ment monufactured shipped, privilege to examine. EXCHANGING A SPECIALTY. Wholesale prices to dealers. Illustrated Catalogues Free. TYPEWEITEE \ 70 Broadway, New York. HEADQUARTERS, \ 144 La Salle St., Chicago.



BICYCLE OF TYPEWRITER,

THE STEAM ENGINE; ITS PRINCIples, its development, its future and perfection—A paper by E. N. Dickerson, giving an outline of the history
of the steam engine, and discussing the principles upon
which it operates and which limit its capacity.
Agures, Contained in the limit its capacity.
BUPPLS—
MENT, No. 68-08.
BUPPLS—
Office and from all newsdealers.

To be had at this
office and from all newsdealers.

WASHINGTON and Seattle its Metropolis. Address

HOME-MADE INCUBATOR.—PRACTIcal directions for the manufacture of an effective incubator that has been careful, tested and found to perform at that may be reasonably expected; with directransport of operating. With 4 figures. Contained in Scileville of Arkitican Suppreneway. No. 6330. Price lo
cents. To be had at this office and from all newsdealers.

DERFECT:

BAPER

CASH An investment of this amount
to the purchaser 100 per cent.
within two years. One of the best suburban properties in Tacoma, Wash, on the
line of street railway connecting two
corner lots, \$155. Write for maps and particulars. A
liberal concession made to parties buying in larve quantitles for cash. Reference, Washington National Bank.
E. N. OUIMETTE, 1336 Pacific Ave., I acoma, Washington.

Annual Trade ROCHESTER MACHINE TOOL WORKS, Brown's Race, ROCHESTER, N. Y. NEW CATALOGUE

VALUABLE PAPERS

ained in SCIRNTIFIC AMBRICAN SUPPLEMENT, sent of charge to any address.

THE TEACHING OF SCIENCE.

Report of the British Association Committee appointed for the purpose of inquiring into and reporting upon the control of teaching chemistry. Contained in SCIENTIFIC AMERICAN SUPPLEMENT. Nos. 734 and of the control of th



Mach Manuartan.

Registred, Sept. SELF-LUBRICATING

Plumbage Pracking

is the best to be had for Steamers.

Locomotives, Stationary Engines,

Pamps, with oil, hot or cold water.

Valves, Steam Hammers, etc. It is

Send for circulary, or sample for

trial to the General Agents,

GENERAL TWEED & CO. GREENE, TWEED & CO., 88 CHAMBERS ST., N. Y.

Brown's Incombustible Machinery Wiping Towels are cheaper and better than "waste." Trial order \$1 a doz. J. G. Bowden, Gen. Agt., 33 Kingston St., Boston, Mass.



THE EACLE THE EASIEST RUNNING BICYCLE IN THE WORLD.

Speed, Comfort and Safety, AGENTS WANTED. se sent Free to any Address.

THE EAGLE BICYCLE MFG. CO.,

SHAPING SHEET METAL.-DESCRIPtion of a method of shaping sine, copper, and other dutie metals by fluid pressure. With 11 figures. Containing SCIENTIFIC AMERICAN SUPPLEMENT, NO. 695. Pri Weents. To be had at this office and from all newsdealers.

INVENTIONS PERFECTED, DETAIL DRAWINGS, PATTERNS, CASTINES, MOULDS, MODELS, SPECIAL TOOLS, DIES, JIES, MOVELTY AND OUPLICATE WORK. CIRCULAR SERT. A. J. WEED & CO., 106 & 108 LIBERTY ST., NEW YORK.



DEAFNESS A HEAS ROISES CURES by Peck's IRVISIBLE TESTILA LAR fortable. Successful where all Remedies Fatt. Ills. book & proofs free. Address F. HIROX, 565 Breadway, New Yark.

CELEBRATED SUTTON RING PACKING

The Koch Patent File, for preserving newspapers, Magazines and pannohieta, has been recently improved and period reduced. Subscribers to the Scientific Antistical Price reduced and REFRIGERATING MACHINES of the subscribers of this part of the subscribers of the su

NOW READY.

Science, *xperimental



BY GEO. M. HOPKINS.

740 Pages. 680 Illustrations.

PRICE, by mail, postpaid, \$4.00

SEND for FREE ILLUSTRATED CIRCULAR and Table of Contents

MUNN & CO., Publishers,

Office of The Scientific American. 361 Broadway, New York.

PROPOSALS FOR IRON BRIDGE Sealed proposals for the building of an Iron Bridge over the Mullies River on the road from New Gretna, Burlington Cu., to Thestmat Neck, Atlantic Cn., N. J., Will be received by the joint committee of the Boards of thosen Freeholders of said countries. All buils to be itosen Freeholders of said counties. All buis to I abmitted on or before September 18, 1806. For specific ons apply to CHARLES W. MATHIS, Chairman, New Gretna, Burlington Co., N. J.

OTTO GAS ENGINES

33,000 SOLD.

Engines and Pumps Combined. For COAL GAS or GASOLINE.

SCHLEICHER, SCHUMM & CO. PHILADELPHIA,

CHICAGO,



ON GAS ENGINES.—A VALUABLE paper by E. Delamare-Deboutteville, touching upon the history of gas motors in general, and describing in detail the "Simplex" engine invented by the author and Mr Maundin, With 25 figures, Contained in SCIPNTIFIC ANTRICAN SUPPLEMENT, No. 7, 13 and 7, 16. Price 10 centre each. To be had at this office and from all newsdeelers.

TIGHT & SLACK BARREL MACHINERY JOHN GREENWOOD & CO

WANTED. - Superintendent for Architectural iron Works, with executive ability and experience. State reference and experience. A mechanical engineer preferred. Apply to S. H. Parvin's Sons, Cincinnati, O.

The Scientific American PUBLICATIONS FOR 1890.

The prices of the different publications in the United States, Canada, and Mexico are as follows.

The Scientific American (weekly one year
The Scientific American Supplement (weekly), one year The Scientific American, Spanish Edition (monthly) one year, 3.00 The Scientific American, Architects and Builders Edition (monthly), one year.

COMBINED BATES. The Scientific American, Supplement, and Architects and Builders Edition. 9.00

Proportionate Rates for Six Months.

This includes postage, which we pay. Remit by postal arguess money order, or draft to order of MUNN & CO., 361 Broadway, New York.

WORKING MODELS & LIGHT MACHINERY. INVENTIONS DEVELOPED. Send for Model Circular. Jones Bros. E Co., Cin'ti. O.

Movertisements.

inside Page, each insertion - - - 75 cents a line. Back Page, each insertion - - - \$1.00 a line.

WORK AS FIVE OF ANY OTHER KIND. -H. S.

Victor Bicycles!



VICTORS ARE BEST ! Overman Wheel Co., Makers,

THE COPYING PAD. -HOW TO MAKE



The MOTOR of 19th CENTURY. Can be used Any Place, to do A. Work, and by Any Cmc. No Boile No First No Steam! No Aske No Gauges! No Engineer! A pe facily safe Motor for all places at purpuses. Cost of operation about o corn on heave to each suddedted hopower. For circulars, etc., address

Charter Gas Engine Co.

BASE BALL — A DESCRIPTION OF the great national game of the United States, by an Euglish wither, Juo, Newton Crane, with diagram of the field and 7 flustrations of players. Contained in SCIEVIPC ABUIESAN SUPPLEMENT, NO. 693. Price B costs. Tobe had at this office and from all news-

NEW KODAKS



" You press the button, we do the rest."

> Seven New Styles and Sizes ALL LOADED WITH Transparent

THE EASTMAN COMPANY.

ROCHESTER, N. Y.

Films.

OIL WELL SUPPLY CO. Ltd. 91 & 92 WATER STREET, Pittaburgh, Pa.,

Manufacturers of everything needed for AFL'A' must Z. N. W MILLIAN for other Gas, Oil, Water, or Mineral Tests, Bollers, Engines, Pipe, Cordage, Brillian Tools, etc. Binstrated catalogue, price lists and discount sheets

OBESITY,-BY WALTER MENDEL



ARTESIAN

catalogue Pieres Artesian and Gil Well Supply Co. 86 Beaver Struck, New York.

ALUMINUM BRONZE AND BRASS a austable material for Propellers.—A paper by agenc H. Cowles, decunsing the various materials that we been used in the construction of propeller wheels, ad giving the details of government tests made of nu-scross significant properties and brosses.



MESSIS, MUNN & CO., in the publication of the Scientific A smitch improvements, and to the Scientific A smitch improvements, and to the scientific A smitch improvements, and to the scientific A smitch improvements. In the lines of basiness if the scientific and the scientific an

signments, Rejected Cases. Hants our signs and seems, sig.

We also send, free of cherge, a Synopsis of Foreign Patent Laws, showing the cost and method of securing patents in all the principal countries of the world.

MENN & CO., Soliestors of Patents, St. Broadway, New York.

BEANCH OFFICES.—No. Six and Six Pitrost, Pacific Swilding, most Re Street, Washington, D. C.

\$85 Lovell Diamond Safety \$85

Strictly high grade in every particular. No better machine made at any price. BICYCLE CATALOGUE FREEL JOHN P. LOVELL ARMS CO., 147 Washington Street, BOSTON, MASS.

THOMAS ALVA EDISON.—A BIOgraphical sketch of the great inventor, with full-page portrait from a recent pototograph. Contained in SCIENTIFIC AMERICAN SUPPLANEITY, No. 7 48. Price in centar to be had at this office and from all newsdesings.



The HARTFORD SAFETY

THE BEST \$100 BICYCLE MADE. adjusted to fit any person, from a boy of 12 to a full-grown man.

HARTFORD CYCLE CO., Hartford, Conn.

PRACTICAL



cientific Book Catalogue RECENTLY PUBLISHED.

ew catalogue containing over 100 pages, includ-as on more than fifty different subjects. Will be tree to any address on application. MUNN & CO., Publishers Scientific Amer 361 Broadway, New

IDEAL MUSICAL BOX

JACOT & SON, SOR RECADINAY

THE GREAT IMPROVEMENT IN

ROOFING

It is adapted for steep or flat roofs in all climates, and can be readily applied by unskilled workmen. There are inferior imitations of our Asbestos Roofing. Purchasers are cautioned.

H.W.JOHNS MANUFACTURING CO.

H. W. Johns' Fire and Water Proof Asbestos Sheathing, Building Folt, etc. Asbestos Boiler Coverings, Steam Packings, Fire-Proof Paints, etc. amples and Descriptive Price List Pree by Mail.

87 Maiden Lane, New York. CHICAGO. PHILADELPHIA. BOSTON

MGRAVING EARL STOE ELM ST



FARREL FOUNDRY & MACHINE CO., Manufacturers, ANSONIA, CONN. COPELAND & BACON, Agents, NEW YORK and PHILADELPHIA.

ICE HOUSE AND COLD ROOM.—BY R. mgravings. Contained in SCHENTIFIC AMERICAN SUR-LEMENT, 59. Price 9 cents. To be had at this office and of all newadesies.



Address for Catalogues
GATES IRON WORKS,
50 C So. Clinton St., Chicag
215 Franklin St., Boston, Mass.
44 Day St., New York.

THE AMERICAN BELL TELEPHONE CO

95 MILK ST., BOSTON, MASS.

This Company owns the Letters Patent granted to Alexander Graham Bell, March 7th, 1876, No. 174,465, and January 30th, 1877, No. 186,787.

The transmission of Speech by all known forms of Electric Speaking Telephones infringes the right secured to this Company by the above patents, and renders each individual user of telephones not furnished by it or its licensees responsible for such unlawful use, and all the consequences thereof, and liable to suit therefor

MACHINISTS' FINE TOOLS. STANDARD TOOL CO., ATHOL, MASS. Send for Catalogue and Price List.



JENKINS STANDARD PACKING I JENKINS BROS., 71 John St., N. Y.; 166 Milk St., Boston.; 21 North 5th St., Phila.; 54 Dearborn St., Chicago

DRYING IN VACUO. -BY EMIL PASSburs. Wet by-products, importance of drying, require-ments in drying, slow evaporation, quick evaporation, evaporation in vacuo, and apparatus for the purpose, practical application. With 4 figures. Contained in SCIENTIFIC AMERICAN SUPPLIMENT, No. 746. Price 10 cents. To be had at this office and from all newmealers.

HE PENNA. DIAMOND DRILL & MFG. CO. BIRDSHORO, PA., Builders of High Class Steam Engines, Diamond Drilling and General Machinery. Flour Mill Rolls Ground and Grouved.

WORKING MODELS and Experimental Machinery, metal or wood, made to order by Mason & Baucia, successors to J. F. Werner, 47 & 49 Centre Street. New York.





HARRISON CONVEYOR!

Handling Grain, Coal, Sand, Clay, Tan Bark, Cinders, Ores, Seeds. & 4

Send for | BORRES | SELECTION | Seeds. & 4 Handling Grain, Coal, Sand, Clay, Tan Bark, Cinders, Ores, Seeds, &c. Send for BORDEN, SELLECK & CO., Manufora, Chicago, III.

BEST IN THE WORLD

STEAM ENGINE, HOW TO MANAGE, By J. C. S. —A very practical paper on the subject. How to five with wood and coal, how to manage the supply, how to clean the engine, how to clean the supply, how to gauge the pump, etc. With 12 illustration contained in SCIENTIFIC AMERICAN SUPPLEMENT, Mo. 747. Price 10 cents. To be had at this officer are

GRAVES ELEVATORS

GRAND PRIZE Paris Exposition, 188

Thin Panel Stock

IN WHITEWOOD, WALNUT, ETC.,
Manufactured by the original "Systems Bartlett,"
received the Highest Award and only "Grand Prize"
given to this industry. The only "systems" introduced
into Europe and America that produces a perfectly
sound cut board.

CABINET WOODS MAHOGANY SAW MILLS. 200 Lewis Street, New York.



THE

Scientific American

ESTABLISHED 1846.

The Most Popular Scientific Paper in the World, Only \$3.00 a Year, including Postage. Weekly, 52 Numbers a Year.

This widely circulated and splendidly illustrated paper is pub ished weekly. Every number contains sixteen pages of useful information and a large number of original engravings of new inventions and discoveries, representing Engineering Works, Steam Machinery, New Inventions. Novetities in Mechanics, Madufactures, Chemistry, Electricity, Te egraphy, Photography, Architecture, Agriculture, Horticulture, Natural History, etc. Complete List of Patents each week.

Terms of Subscription.—One copy of the SCIENTIFIC AURITICAN will be sent for one pear—46 number—postage prepaid, to any subscriber in the United States. Canada or Maxico, on receipt of three deliurs by the publishers; six months, \$1.00; three months, \$1.00.

Clabs.—Special rates for several names, and to Post Maxico. Write for particulars.

The eafest way to result is by Postal Order. Draft, or Express Money Order. Money carefully placed inside of envelopes, socurely sealed, and correctly addressed, seldom goes astray, but is at the sender's risk. Address all letters and make all orders, drafts, etc., payable to

MUNN & CO., 361 Broadway, New York.

THE Scientific American Supplement.

This is a separate and distinct publication from THE SCIENTIFIC AMERICAN, but is uniform therewith to size, every number containing aixteen large pages full of engravings, many of which are taken from foreign papers, and accompanied with translated descriptions. THE SCIENTIFIC AMERICAN SUPPLEMENT is published weekly, and includes a very wide range of contents. It presents the most recent rapers by eminent writers in all the principal departments of Science and the Useful Arts, embracing Biology, Geclosy, Mineralost, Natural History, Geography, Archmology Astronomy, Chemistry, Electricity, Light, Heat, Mechanical Engineering, Steam and Railway Engineering, Mining, Ship Building, Marino Engineering, Photography, Teomology, Macufacturing Industries, Sanitary Engineering, Agriculture, Horticalture, Domestic Economy, Biography, Medicine, etc. A vast amount of fresh and valuable information obtainable in no other publications.

The most important Engineering Works, Mechanisms, and Manufactures at home and abroad are illustrated and described in the Supplement.

Price for the Supplement.

Price for the Supplement for the United States and Canada. Skub a year, or one copy of the Supplement, both mailed for one year for \$1.00. Single copies 10 cents. Address and remit by mastal order, express money exper, or check. and remit by postal order, express money order, or check.

MUNN & Co., 361 Brondway, N. Y.,

Publishers SCIENTIFIC AMERICAN.

Building Edition.

THE SCIENTIFIC AMERICAN ARCHITECTS' AND BUILDERS' EDITION is issued monthly. \$2.50 a year. Single copies, 25 cents. Forty inrge quarto pages, equal to about two hundred ordinary book pages; forming a large and splendid Magnazing of Architecture, richadvances of the department of Architecture, richly adorned with cirgunt, plates in colors, and with other line engravings; illustrating the most interesting examples of modern Architectural Construction and alled subsects.

altied subjects.

A special feature is the presentation in each number of a variety of the laiest and best plans for private residence, city and country, including those of very moderate cost as well as the more expensive. Drawings in perspective and in color are given, together with full Plans. Spec Scattons, Sheets of Details, Estimates, etc. The ologance and cheapness of this magnificent work have won for it the Largest Circulation of any Archinecural publication in the world. Sold by all newsdealers. Elso a year. Remit to

MUNN & CO., Publishers, 361 Broadway, New York.

PRINTING INKS. THE "Scientific American" is printed with CHAS.

ENEU JOHNSON & CO. S INK, Tenth and Louders Sta., Phila, and 47 Rose St., cop., Duane St., N. Y.